SRPL8
Server System
Product Guide

Order Number: A49445-001

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Part I: User's Guide

1 Chassis Description

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⚠️ **WARNING**

> **Only a QUALIFIED SERVICE TECHNICIAN is authorized to remove the server covers and to access any of the components inside the server. Before removing the covers, see "Safety: Before You Remove Server Covers" on page 93 and " Warnings and Cautions" on page 94.**

This manual is divided into two parts:

- *User's Guide*, beginning on page 11—describes procedures that DO NOT REQUIRE internal server access. You do not need to be a qualified service technician to perform procedures listed in the *User's Guide*.
- *Service Technician's Guide*, beginning on page 91—describes procedures that REQUIRE internal server access. You must be a qualified service technician to perform procedures listed in the *Service Technician's Guide*.

⟹ **NOTE**

> The SRPL8 server system is an upgrade to the SRPM8 server system with PCI-X features added. The SRPL8 server system implements PCI 2.1-compliant buses with four PCI-X-enabled slots. In this document, the term "PCI" is loosely used to refer to PCI and PCI-X features. The term "PCI-X" is limited to references to PCI-X only.

1 Chassis Description

The SRPL8 rack server is easy to integrate and can easily accommodate the needs of a variety of high-performance applications—for example, network servers, multiuser systems, and large database operations. As your application requirements increase, you can upgrade your server with:

- More powerful and/or additional processors
- An additional processor mezzanine carrier with cache coherency filters
- An additional memory module and additional memory
- Other peripheral devices
- Add-in I/O boards

Table 1.   Server Physical Specifications

Specification	Value
Height	31.12 cm (12.25 inches, 7u)
Width	44.45 cm (17.5 inches)
Depth	71.12 cm (28.0 inches)
Weight	51.4 kg (113 lbs) minimum configuration 60 kg (132 lbs) maximum configuration
Required front clearance	10 inches (inlet airflow <35 °C / 95 °F)
Required rear clearance	8 inches (no airflow restriction)
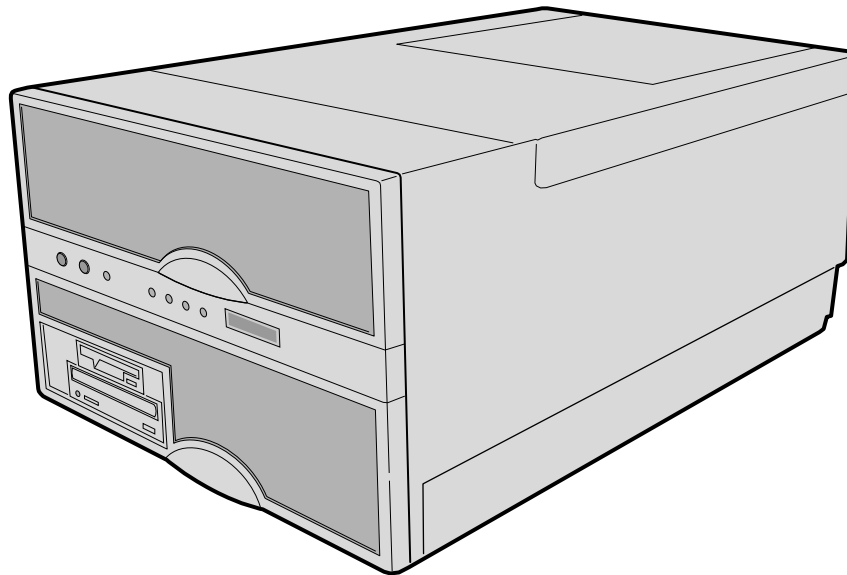
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Figure 1. SRPL8 MP Server

Chassis Feature Summary

Table 2.   Chassis Feature Summary

Feature	Comment
Power system with redundancy	The 750 watt, 220 VAC autoranging power supplies include integrated fans for cooling. When the server is configured with three supplies (2 + 1), the third provides redundancy. The supplies can be replaced—hot-swapped—without turning off server power. The server requires a minimum of two power supplies. LEDs on the back of the power supply indicate power on, failure, and predictive failure.
Server chassis	The electrogalvanized metal used in manufacturing the server chassis minimizes electromagnetic interference (EMI) and radio frequency interference (RFI).
	The peripheral bay provides the interface for 3.5- and 5.25-inch media. It can support:
	• One 5.25-inch IDE CD-ROM drive in the 5.25-inch half-height bay. (Optional: any IDE or single-ended SCSI device, like a tape drive.)
	• Two 3.5-inch wide by 1.0- or 1.6-inch hot-swappable low-voltage differential SCSI (LVDS) hard disk drives mounted side-by-side in the 3.5-inch hot-swapping bays. These bays allow hot-swapping of hard disk drives without shutting down the server.
	Ten hot-plug PCI I/O expansion slots (six 33 MHz PCI, four 100 MHz PCI-X).
	The plastic front bezel provides airflow and easy access to drives in the hot-swapping bays. The removable top covers provide proper airflow and easy access to components inside the server. Only technically qualified personnel should remove the server covers.
Cooling system with redundancy	Six fans (5 + 1) cool and circulate air through the server. The sixth fan is redundant. The fans can be replaced—hot-swapped—without turning off server power. An LED indicator mounted next to each fan guarantees positive identification of the failed fan.
	Integrated power supply fans—two or three—cool and circulate air through the power supplies and the bottom of the chassis.
Server management	Interintegrated circuit bus (I^2C) for diagnostic and intrachassis communication. Interchassis management bus (ICMB) for interchassis platform management communications.
	Real-time clock/calendar (RTC).
	Front panel controls and indicators (LEDs).
	Basic Input/Output System (BIOS), Power-on Self Test (POST), and Setup Utility stored in a flash memory device.
	System Setup Utility (SSU).
	QLogic[†] SCSI Utility.
	Emergency Management Port (EMP) utility.
	Field Replacement Unit (FRU) and Sensor Data Record (SDR) load utility.

Chassis Front Controls and Indicators
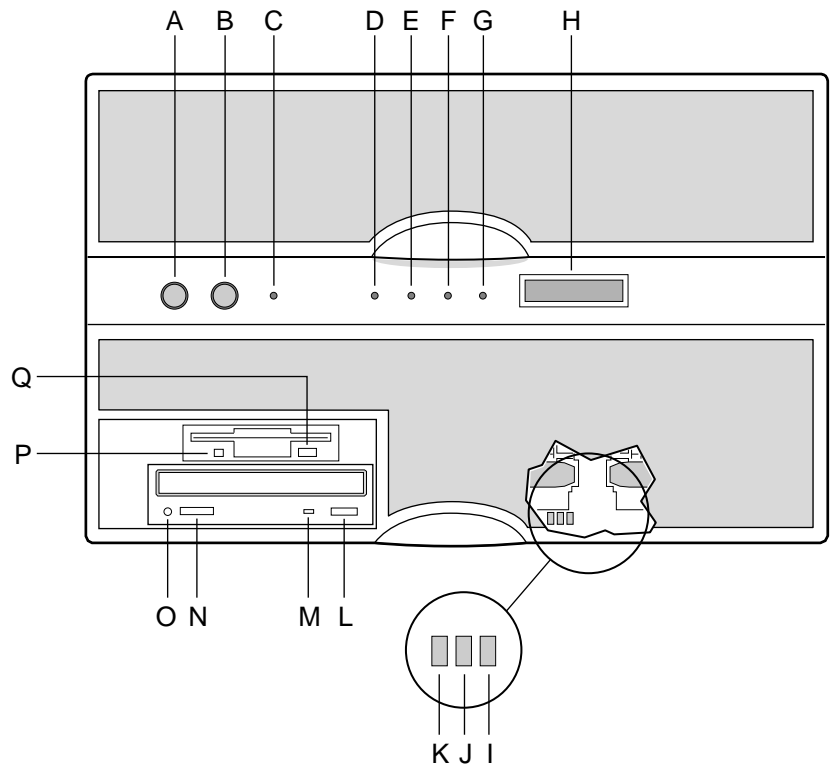
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Figure 2. Front Controls and Indicators

Table 3.   Front Controls and Indicators

Item	Feature	Description
Front Panel		
A	Power switch	When pressed, it turns on or off the server. The +5 V standby voltage is ON whenever the server is plugged in.
B	Reset switch	When pressed, it resets the server and causes the power-on self test (POST) to run.
C	NMI switch	When pressed, it causes a nonmaskable interrupt. This switch is recessed behind the front panel to prevent inadvertent activation. It must be pressed with a narrow tool (not supplied).
D	Power LED (green)	When lit continuously, it indicates the presence of DC power in the server. When not lit, it indicates power is turned off or power source is disrupted.
E	Power fault LED (yellow)	When lit continuously, it indicates presence of DC power.
F	Cooling fault LED (yellow)	When flashing, it indicates a fan failure.
G	Drive fault LED (yellow)	When lit continuously, it indicates an asserted fault status on one or more hard disk drives in the hot-swapping bay. When flashing, it indicates drive reset in progress.
H	Front panel LCD	Displays information about processor type and failure codes.
Status LEDs for SCSI Drives in Hot-swapping Bays		
I	Drive power LED (green)	When lit continuously, it indicates the presence of the drive and power on the drive.
J	Drive activity LED (green)	Indicates drive activity.
K	Drive fault LED (yellow)	When lit continuously, it indicates an asserted fault status on one or more hard disk drives in the hot-swapping bay. When flashing, it indicates drive reset in progress.
Typical CD-ROM Drive		
L	Open/close button	When pressed, it opens or closes the CD-ROM tray.
M	Activity LED	When lit, it indicates the drive is in use.
N	Volume control	It adjusts the volume of headphones or speakers.
O	Headphone jack	It provides a connection for headphones or speakers.
3.5-inch Diskette (Floppy) Drive		
P	Activity LED	When lit, it indicates the drive is in use.
Q	Ejector button	When pressed, it ejects the diskette.

Chassis Back Controls and Features
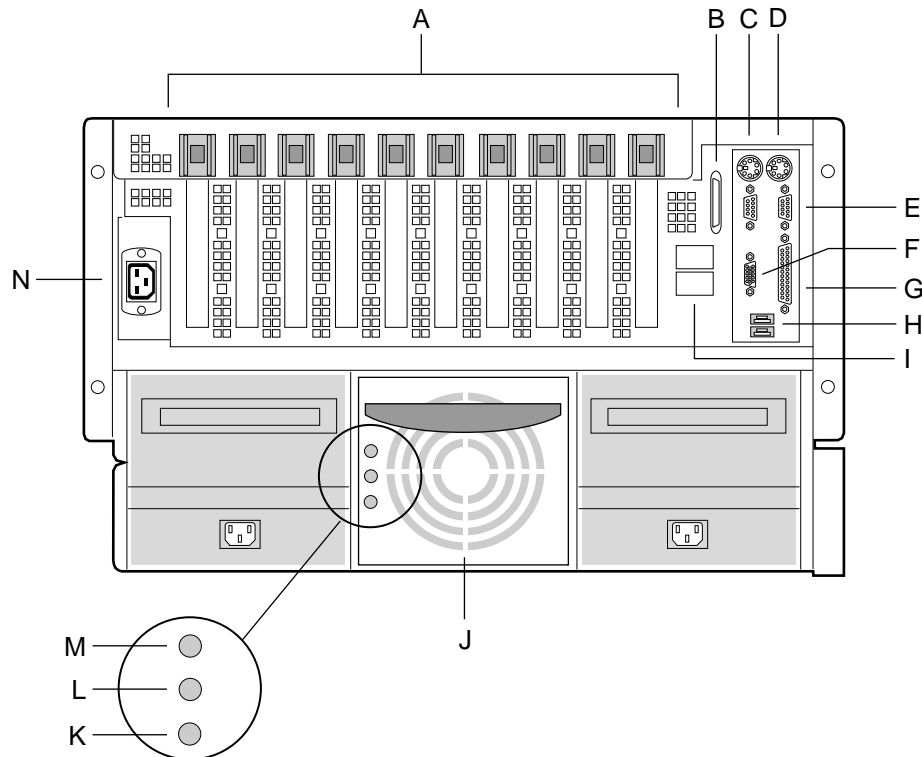
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Figure 3. Chassis Back View

- A. PCI add-in board expansion slots
- B. External LVDS connector
- C. PS/2[†]-compatible keyboard/mouse port, 6-pin
- D. PS/2-compatible keyboard/mouse port, 6-pin
- E. PS/2-compatible serial ports A and B, 9-pin RS-232 connector
- F. Super VGA compatible, 15-pin video connector
- G. PS/2-compatible parallel port (LPT), 25-pin bidirectional subminiature D connector
- H. USB ports 0 and 1, 4-pin connector
- I. Interchassis Management Bus (ICMB) connectors port 1 and 2
- J. Power supplies (in this view, supplies must be populated from left to right; the right bay would contain the redundant supply)
- K. Power supply failure LED (yellow)
- L. Power supply predictive failure LED (yellow) for power supply fan
- M. Power supply power LED (green)
- N. AC input power connector

Peripherals

The peripheral bay provides the interface for 3.5-inch and 5.25-inch media.

3.5-inch Diskette Drive

The 3.5-inch diskette drive in the peripheral bay supports 720 KB and 1.44 MB media. The drive is externally accessible from the front of the system.

3.5-inch Hard Drive Bays

The peripheral bay contains two hot-swapping bays for two 3.5-inch wide (1.0-inch high or 1.6-inch high) wide/fast-20 SCSI III SCA-type hard drives. The hard drives are externally accessible at the front of the system and connect to a wide LVDS hot-swap SCSI backplane.

As part of the hot-swap implementation, a drive carrier with an integral heatsink is required. The drives are mounted in the carrier with four fasteners and the carrier snaps into the chassis with a locking handle. A single metal EMI shield and plastic door cover the drive bays. A hot-swapping bay is provided for drives that are 3.5 inches wide and 1.0 or 1.6 inches high. Drives can consume up to 24 watts of power and must be specified to run at a maximum ambient temperature of 40 °C (104 °F).

5.25-inch Removable Media Device Bay

The peripheral bay has one 5.25-inch half-height bay that is accessible from the front of the system. This bay is intended to provide space for a tape drive for backup or for another removable device.

We recommend that you do not use this bay for a hard disk drive, because hard disk drives generate EMI (increasing ESD susceptibility), and because of inadequate cooling.

Hot-Swap Power Supplies

The chassis can be configured with two or three 750-watt power supplies in a 2 + 1 redundancy configuration. If you have three supplies installed, you can hot-swap a failed supply without affecting system functionality. If you have two supplies installed, they must occupy the left and center bays (as you face the back of the server—see Figure 3 on page 17). Each supply is designed to minimize EMI and RFI. This system is designed to operate at 100/200 VAC only.

The DC output voltages of each power supply are:
* +3.3 V at 36.0 A max
* +5 V at 36.0 A max (total combined output of +3.3 V and +5.5 V not to exceed 195 W)
* +12 V at 36.0 A with 42.0 A <10ms peak
* +24 V at 100 mA
* -12 V at 1.0 A
* +5 V standby 1.0 A

Each supply docks to a 36-pin connector on the system midplane.

System Cooling

The server contains two independent cooling subsystems:
* The upper system, cooling the front panel, profusion carrier, and I/O carrier
  (5 + 1 redundancy)
* The lower system, cooling the memory modules, peripheral bay, and power supplies
  (2 + 1 redundancy)

Both subsystems offer redundant cooling capabilities. As shipped from the factory, the minimum configuration includes six system fans in the upper subsystem and two power supplies (each has an integrated fan). You can install one additional power supply.

⟹ **NOTE**

All chassis covers must be on the system for proper cooling.

2 Boardset Description

The modular scaleable architecture of the SRPL8 rack server supports symmetrical multiprocessing (SMP) and a variety of operating systems. The server comes with Peripheral Component Interconnect (PCI) and Industry Standard Architecture (ISA) buses. ISA buses are used internally only. The system has no ISA slots or a way for the user to make use of the ISA bus. The server boardset consists of a set of printed circuit boards:

- Profusion carrier
    - — Processor mezzanine board(s)
    - — Front side bus (FSB) terminator modules
    - — Cache coherency filters
- PCI hot-plug (PHP) I/O carrier
    - — Low-voltage differential SCSI (LVDS) hot-swap disk backplane
    - — I/O riser board
- Two memory modules
- Front panel controller board
- Midplane

The profusion carrier is mounted horizontally toward the front of the chassis, and the PHP I/O carrier is mounted horizontally towards the rear of the chassis. The carriers plug into connectors on the midplane mounted between the two carriers. The midplane interconnects the carriers with the memory modules and power supplies. The front panel board is mounted in front of the profusion carrier in the same plane. This board provides the user interface, server management, cooling system control, and power control.
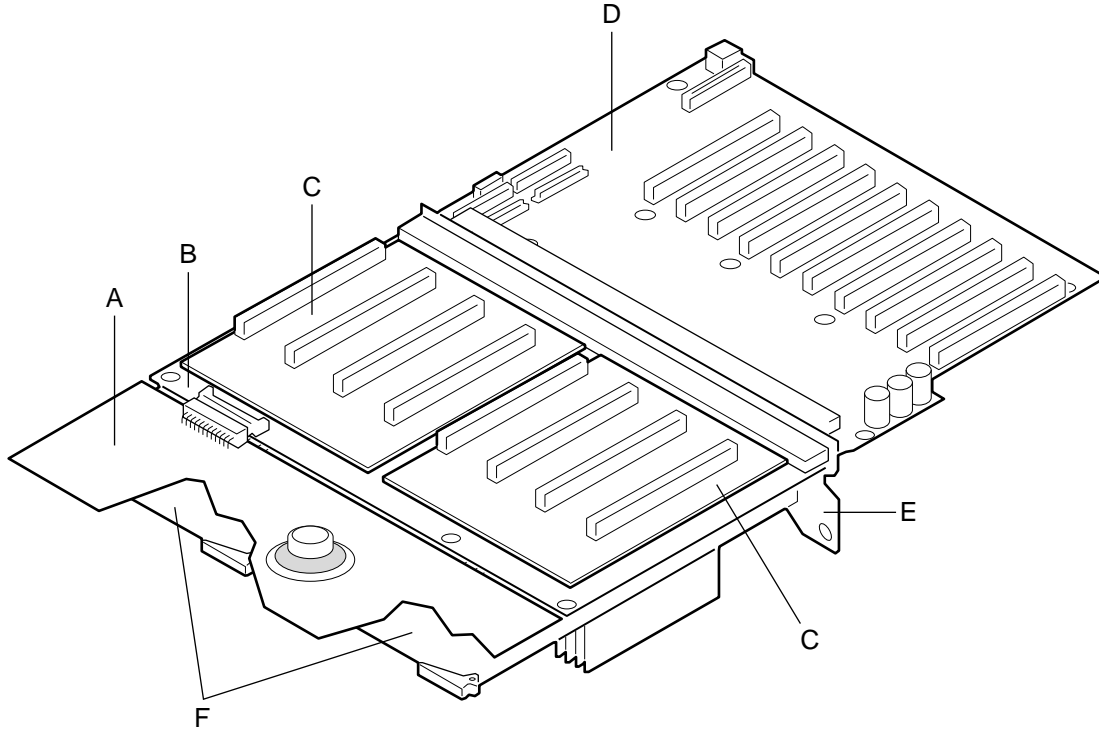
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Figure 4. Boardset Overview

A. Front panel board
B. Profusion carrier
C. Processor mezzanine board
D. I/O carrier
E. Midplane
F. Memory modules

Boardset Features

Table 4.   Boardset Features

Feature	Description
Profusion carrier	The profusion carrier provides the interface for processors (via one or two processor mezzanine boards), memory modules, and cache coherency filters.
Processor mezzanine boards	The profusion carrier supports up to two processor mezzanine boards. Each mezzanine board supports up to four Pentum® III Xeon™ processors.
Pentium III Xeon processor packaged in an S.E.C. cartridge	Installed: Up to eight Pentium III Xeon processors, packaged in single edge contact (S.E.C.) cartridges and installed in 330-pin Slot 2 processor connectors, operating at 5/12 V. The profusion carrier provides connectors for two processor mezzanine boards. Each mezzanine board provides four Slot 2 connectors. The carrier's voltage regulator is automatically programmed by the processor's VID pins to provide the required voltage.

continued

Boardset Description

Table 4. Boardset Features (continued)

Feature	Description
Memory modules	Two dual plug-in modules containing interleaved pathway to main memory supporting PC100 registererd SDRAM. Each memory module supports from 128 MB to 16 GB of error correction code (ECC) memory using sixteen 72-bit dual inline memory modules (DIMMs). The modules interface to the profusion carrier through the midplane.
FSB terminator module	This module plugs into any unpopulated Slot 2 connector on either processor mezzanine board. The module terminates the FSB GTL+ signals of the Slot 2 connector when a processor S.E.C. cartridge is not installed in a connector.
Cache coherency filters	The cache coherency filters contain information on each of the two processor buses, thus enabling each bus to perform with minimal snoop cycles. The profusion carrier requires that these filters be populated if the server has two processor mezzanine boards that are both populated with processors.
PHP I/O carrier	Ten hot-pluggable 64-bit PCI expansion slots (six 33 MHz PCI, four 100 MHz PCI-X).
	Integrated ATI Rage XL graphics (SVGA) controller with 8 MB of video memory.
	The QLogic 12160 Ultra 160 LVDS SCSI controller supports two LVDS channels. One channel is used internally to provide support for the internal SCSI drives (connected to the LVDS hot-swap disk backplane) and CD-ROM or tape drive. The second LVDS channel is routed to the rear of the chassis to support external devices.
	The diskette controller supports one drive.
	The PCI-enhanced Integrated Drive Electronics (IDE) interface supports one IDE bus.
	PS/2-compatible keyboard/mouse controller.
	Two universal serial bus (USB) ports.
I/O riser board	This board contains all legacy I/O connections; it plugs into an edge connector on the PHP I/O carrier.
	PS/2-compatible keyboard and mouse ports (interchangeable).
	PS/2-compatible parallel port.
	Analog VGA, 15-pin video port.
	Two PS/2-compatible, 9-pin serial ports.
LVDS hot-swap disk backplane	This backplane supports hot-swapping of up to two SCA2-type SCSI drives, mounted in carriers, in and out of the hot-swapping bays.
Front panel board	The front panel board provides the user interface to the server. The board allows other servers to communicate with this server, even while power is down, via an Interchassis Management Bus (ICMB).
	Push-button switches control power-up, reset, and nonmaskable interrupt (NMI) functions.
	LEDs indicate power on, power supply failure, hard drive failure, or a fan or other server cooling failure.
	An LCD panel provides information about boot status, available number of processors, and other server management information.
Midplane	The midplane:
	• Electrically connects the PHP I/O and profusion carriers
	• Contains the sockets for the memory modules
	• Distributes DC power to the PHP I/O and profusion carrier, disk backplane, cooling fans, memory boards, and front panel board
	• Distributes the power load of the server among two or three 750-watt autoranging power supplies

Processor Overview

Each Pentium lll Xeon processor is packaged in a single edge contact (S.E.C.) cartridge. The cartridge includes:

- The processor core with an integrated 32 KB primary (L1) cache
- The secondary (L2) cache
- A thermal plate
- A back cover

Processors used with the SRPL8 server must be:

- 5/12 volts
- 100 MHz FSB
- 1 or 2 MB cache
- Validated by Intel for SRPL8 systems

Each processor implements the MMX™ technology with streaming SMID extensions and maintains full backward compatibility with the 8086, 80286, Intel386™, Intel486™, Pentium, and Pentium Pro processors. The processor's numeric coprocessor significantly increases the speed of floating-point operations and complies with ANSI/IEEE standard 754-1985.

Each S.E.C. cartridge connects to one of two processor mezzanine boards through a 330-pin Slot 2 edge connector (SC330.1). The cartridge is secured to the mezzanine carrier by a retention bracket. Each mezzanine board connects to the profusion carrier. Depending on configuration, your system has one to eight processors.

The processor external interface is multiprocessor (MP)-ready and operates at 100 MHz. The processor contains a local APIC unit for interrupt handling in MP and uniprocessor (UP) environments.

The L2 cache is located on the same die as the processor core and L1 cache. The cache:

- Is offered in 1 MB and 2 MB configurations
- Is ECC protected
- Operates at the full core clock rate

Memory Overview

Main memory resides on two add-in boards, called memory modules. Each memory module contains slots for 16 DIMMs and is attached to the profusion carrier through a 300-pin connector on the midplane. The memory controller supports PC 100-registered SDRAM DIMMs. Various DIMM sizes are supported, but each DIMM must be at least 128 MB. Memory amounts from 128 MB to 16 GB per module are supported. The ECC used for the memory module is capable of correcting single-bit errors (SBEs) and detecting 100% of double-bit errors over one code word. Nibble error detection is also provided.

You can install:

- From 1 to 32 DIMMs (total number of DIMMs for two memory modules)
- Equal number of DIMMs on each memory module (except when only one DIMM is used)

⟹ **NOTE**

> When only a single memory module is installed, DIMM sizes on that module may vary, but when both memory modules are installed, the DIMM configuration on the two modules should be identical to support memory interleaving for performance gains.

Depending on how the memory modules are installed, the memory subsystem can operate in two different modes: interleaved and single-port.

- **Interleaved mode** (two memory modules installed): The memory modules share a common address range. One memory module responds to even-numbered cache lines, while the other responds to odd-numbered cache lines. This configuration offers the highest performance because it allows the two modules to be used in a balanced fashion, reducing address conflicts. To operate in interleaved mode, the **DIMMs MUST BE INSTALLED IN PAIRS (ONE ON EACH MODULE) AND IN THE SAME LOCATIONS ON EACH MODULE**.
- **Single port mode** (one memory module installed): The single memory module responds to all memory addresses. The DIMMs on this single carrier need not be installed in pairs and can be installed one DIMM at a time.

DIMM Installation Sequence

A single carrier will support DIMM population in various configurations (empty sockets included). However, when fewer than 16 DIMMs are installed on a memory module, the preferred population order is to start from the lowest J number and populate sequentially to the highest. This recommendation helps maintain optimal signal integrity and thermal performance.

⟹ **NOTE**

Maximum capacity is limited to 16 GB with one memory module installed.
This increases to 32 GB with two modules.

Some OSs and application programs use base memory while others use both conventional and extended memory. Examples:

- Base memory: MS-DOS[†], OS/2, Windows NT[†], and UNIX[†]
- Conventional and extended memory: OS/2, Windows NT, and UNIX

MS-DOS does not use extended memory; however, some MS-DOS utility programs like RAM disks, disk caches, print spoolers, and windowing environments use extended memory for better performance.

BIOS automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs, and reports memory size and allocation to the system via configuration registers.

⟹ **NOTE**

DIMM sizes and compatibility: Use DIMMs that have been tested for compatibility. Contact your sales representative or dealer for a list of approved DIMMs.

Peripherals

Super I/O Chip

The 37C937 Super I/O device supports two serial ports, one parallel port, diskette drive, and PS/2-compatible keyboard and mouse. The system provides the connector interface for each port.

Serial Ports

Both serial ports are relocatable. By default, port A is physically the left connector (as you look at the back of the system — see Figure 3 on page 17), port B the right connector. Each serial port can be set to one of four different COMx ports, and each can be enabled separately. When enabled, each port can be programmed to generate edge- or level-sensitive interrupts. When disabled, serial port interrupts are available to add-in boards.

Parallel Port

The 25/15-pin connector stacks the parallel port over the VGA. The 37C937 provides one IEEE 1284-compatible 25-pin bidirectional EPP (supporting levels 1.7 and 1.9). BIOS programming of the Super I/O registers enables the parallel port and determines the port address and interrupt. When disabled, the interrupt is available to add-in boards.

Add-In Board Slots

The I/O carrier has ten 64-bit PCI buses contained in four PCI segments:

- PCI-A provides for PCI slots 1 and 2 (33 MHz), dual-channel LVDS SCSI controller, video, and PIIX4E.
  - The PIIX4E controls communications to IDE, onboard ISA, USB, and Super I/O for handling the keyboard, mouse, diskette drive, parallel port, and serial ports.
- PCI-B provides for PCI slots 3 through 6 (33 MHz).
- PCI-C provides for slots 7 and 8 (two of the 100 MHz PCI-X, 3.3 V slots).
- PCI-D provides for slots 9 and 10 (the two other 100 MHz PCI-X, 3.3 V slots).

Video

The onboard, integrated ATI Rage XL 64-bit VGA chip contains an SVGA controller that is fully compatible with legacy video standards. The standard system configuration comes with 8 MB of onboard SDRAM memory. The video controller supports pixel resolutions of up to 1600 x 1200 at 85 Hz and up to 16.7 M colors.

The SVGA controller supports analog VGA monitors (single and multiple frequency, interlaced and noninterlaced) with a maximum vertical retrace noninterlaced frequency of up to 100 Hz.

You cannot add video memory to this system. Depending on the environment, the controller displays up to 16.7 M colors in some video resolutions. It also provides hardware-accelerated bit block transfers (BITBLT) of data.

SCSI Controller

A QLogic 12160 Ultra 160 SCSI chip provides two 16-bit high-speed SCSI channels. This high-performance SCSI controller is capable of providing data rates up to 160 MB/sec per channel in 16-bit operations to ensure maximum data throughput while minimizing PCI bus overhead.

Each channel is capable of operations using either 8- or 16-bit SCSI providing 10 MB/sec (Fast-10) or 20 MB/sec (Fast-20) throughput, or 20 MB/sec (Ultra), 40 MB/sec (Ultra-wide), 80 MB/sec (40 MHz) (Ultra-2), or 160 MB/sec (40 MHz double clocked) (Ultra 160).

The QLA12160 has its own set of PCI configuration registers and SCSI I/O registers. As a PCI 2.1 bus master, the controller supports burst data transfers on PCI up to the maximum rate of 132 MB/sec using on-chip buffers.

In the hot-swap SCSI hard drive bay, the system supports up to two 1-inch SCSI hard disk drives. The 5.25-inch removable media bay supports one SCSI or IDE device (the controller itself supports more devices, but the 5.25-inch bay can contain a maximum of one device). SCSI devices do not need to operate at the ultra transfer rate. All drives on the bus must be Ultra 160 (LVD) to run at 160 MB/sec. The 5, 10, and 20 MHz operations can coexist on the bus, and each device will interact at its appropriate speed.

No logic, termination, or resistor loads are required to connect devices to the SCSI controller other than termination in the device at the end of the cable. The SCSI bus is terminated on the I/O carrier with active terminators.

IDE Controller

IDE is a 16-bit interface for intelligent disk drives with AT† disk controller electronics onboard. The PCI/ISA/IDE Accelerator, called PIIX4E, is a multifunction device on the I/O carrier that acts as a PCI-based Fast IDE controller. The device controls:

- PIO and IDE DMA/bus master operations
- Mode 4 timings
- Transfer rates up to 22 MB/sec (33 MB/sec using ultra DMA transfers)
- Buffering for PCI/IDE burst transfers
- Master/slave IDE mode

Keyboard and Mouse

The PS/2 compatible keyboard and mouse connectors are mounted in a single-stacked housing with the mouse connector over the keyboard. External to the system, they appear as two connectors.

The user can plug in the keyboard and mouse to either connector before powering up the system. BIOS detects these and configures the keyboard controller accordingly.

The keyboard controller is functionally compatible with the 8042A microcontroller. The system can be locked automatically if no keyboard or mouse activity occurs for a predefined length of time, if specified through the SSU (see security options in "Security Add-In" on page 57). Once the inactivity (lockout) timer has expired, the keyboard and mouse do not respond until the previously stored password is entered.

Server Management

Most of the server management features are implemented using three microcontrollers, the baseboard management controller (BMC) on the I/O carrier, the front panel controller (FPC) on the front panel board, and the hot-swap controller (HSC) on the LVDS backplane.

The primary function of the BMC is to autonomously monitor system platform management events and log their occurrence in the nonvolatile System Event Log (SEL). While monitoring, the BMC maintains the nonvolatile sensor data record repository (SDRR), from which run-time information can be retrieved. The BMC provides an ISA host interface to SDRR information, so software running on the server can poll and retrieve the current status of the platform. A shared register interface is defined for this purpose.

SEL contents can be retrieved after system failure or during regularly scheduled maintenance. To retrieve SEL contents, field service personnel use tools such as the SSU SEL Viewer or the Intel® Server Control management software.

The BMC:

- Provides temperature and voltage monitoring
- Monitors processor presence and performs Fault Resilient Booting (FRB) control
- Manages SEL interface
- Manages SDRR interface
- Manages SDR/SEL timestamp clock
- Provides Field Replaceable Unit (FRU) information interface
- Provides system management watchdog timer functions
- Provides pre-timeout (of watchdog timer) SMI capability
- Provides front panel NMI handling
- Provides event receiver functionality
- Manages ISA host and Intelligent Platform Management Bus (IPMB) interface
- Manages secure mode control, front panel lock/unlock initiation, and video blank and diskette write protect monitoring and control
- Provides sensor event initialization agent
- ACPI Support

Front Panel Controller (FPC)

The FPC manages:

- Server power control consolidation from several sources
  — push-button power signal from the front panel connector
  — real-time clock (RTC)
  — Intel® remote management card (IRMC), if installed
  — commands from the Intelligent Platform Management Bus
- Power and reset switch interfaces
- Fault LEDs
- Chassis, midplane and power supplies Field Replacement Unit (FRU) inventory interface
- Server hard reset generation
- Server power fault indication
- Interchassis Management Bus (ICMB) bridge device
- EMP connection
- LCD interface
- Fan predictive failure detection and indicator control
- Power supply predictive failure detection and indicator control
- ACPI Support
- Wake on LAN† via Magic Packet† support

Hot-swap Controller (HSC)

The HSC:

- Implements the SAF-TE command set
- Controls the fault lights and drive power-on
- Provides a path for management information via SCSI
- Retrieves drive fault status, backplane temperature, and fan failure information via the IPMB
- Queries the status of the front panel controller for power supply information
- Controls drive power-on and power-down, facilitating hot-swapping

System Security

There are several ways to prevent unauthorized entry or use of the server.

Security with BIOS Setup:

- Set server administrative and user passwords.
- Set secure mode to prevent keyboard or mouse input and to prevent use of the front panel controls.
- For more information, see "Security Menu" on page 45.

Security with the System Setup Utility (SSU):

- Enable the keyboard lockout timer so that the server requires a password to reactivate the keyboard and mouse after a specified time-out period of 1 to 128 minutes.
- Set an administrative password.
- Set a user password.
- Activate the secure mode hot-key.
- Disable writing to the diskette drive.
- For more information, see "Security Add In" on page 57.

Password Protection

BIOS passwords prevent unauthorized tampering with the server. If you set the user password, but not the administrative password, BIOS requires you to enter the user password before you can boot the server or run the SSU. If you set both passwords, entering either password lets you boot the server or enable the keyboard and mouse. Only the administrative password lets you change the server configuration with the flash-resident Setup utility.

Secure Boot Mode

Secure boot mode allows the server to boot and run the OS. However, you cannot use the keyboard or the mouse until you enter the user password.

You can use Setup to put the server in secure boot mode. If BIOS detects a disk in the CD-ROM drive or a diskette in floppy drive A at boot time, it prompts you for a password. When you enter the password, the server boots from the disk in the CD-ROM drive or the diskette in drive A. Entering a password also disables secure mode.

If there is no disk in the CD-ROM drive or diskette in drive A, the server boots from drive C and automatically goes into secure mode. All enabled secure mode features go into effect at boot time.

If you set a hot-key combination, you can secure the server immediately.

Boot Sequence Control

The BIOS security features determine the boot devices and the boot sequence. They also control disabling writes to the diskette drive in secure mode. You can use the SSU or Setup to select each boot device. The default boot sequence is diskette, hard disk, CD-ROM, and network.

Boot Without Keyboard

The server can boot with or without a keyboard. Before it boots, BIOS displays a message keyboard detection. During POST, BIOS automatically detects and tests the keyboard if one is present.

Locked Power and Reset Switches

The power and reset push-button switches on the front panel are locked when the server is in secure mode. To exit from the secure mode, you must enter your user password.

Diskette Write Protect

If Diskette Write Protect is enabled in Setup, it write-protects the diskette drive only while the server is in the secure mode. To exit secure mode, enter your user password.

Video Blanking

If Video Blanking is enabled in Setup, the video display will be off when the server is in secure mode. To exit secure mode, enter your user password.

Emergency Management Port (EMP)

The EMP is a feature of server management. EMP lets the front panel controller (FPC) communicate with the server via the serial port even if the server power is off. To restrict EMP access, you can enable an administrator password in Setup. If the administrator enters a new EMP password or clears an old one, BIOS sends the appropriate command via the I^2C bus interface to the FPC. To change the password from Setup again, enter the new password twice.

If the administrator sets the Password Clear switch to the Clear position, BIOS clears the administrator and user passwords (to change switches, see "Configuration Switches" on page 182). It also attempts to clear the EMP password. If the FPC is not present or is not functioning properly, BIOS times out and continues.

3 Configuration Software and Utilities

This chapter describes the Power-on Self Test (POST) and system configuration utilities. Table 5 briefly describes the utilities.

Table 5.   Configuration Utilities

Utility	Description and brief procedure	Page
BIOS Setup ("Setup")	You can use Setup to change system configuration defaults. If the system does not have a diskette drive, or the drive is disabled or misconfigured, use Setup to enable it. Or, you can move the CMOS switch on the system board from the default setting (Protect CMOS memory) to the Clear setting; this will allow most system configurations to boot. For the procedure to do this, see "CMOS Clear Switch" on page 183. Then run the SSU to configure the system.	35
System Setup Utility (SSU)	Use for extended system configuration of onboard resources and add-in boards, viewing the system event log (SEL), setting boot device priority, or setting system security options. The SSU can be run from either the configuration software CD-ROM or from a set DOS-bootable diskettes. See the printed *Quick Start Guide* to make a set of SSU diskettes. Information entered via the SSU overrides information entered via Setup.	51
Direct Platform Control (DPC) Console	Use to access and monitor the server remotely.	63
FRUSDR Load Utility	Use to update the Field Replacement Unit (FRU), Sensor Data Record (SDR), and Desktop Management Interface (DMI) flash components.	72
BIOS Update Utility	Use to update BIOS or recover from a corrupted BIOS update.	77
Firmware Update Utility	Use to update the BMC flash PROM.	80
QLogic SCSI Utility	Use to configure or view the settings of the SCSI host adapters and onboard SCSI devices in the system.	80

Hot Keys

Use the keyboard's numeric pad to enter numbers and symbols.

Table 6.   Hot Keys

To do this:	Press these keys
Clear memory and reload the operating system—this is a system reset.	<Ctrl+Alt+Del>
Secure your system immediately.	<Ctrl+Alt> + hotkey (Set your hot-key combination with the SSU or Setup.)
Enter BIOS Setup during BIOS POST.	F2
Abort memory test during BIOS POST.	ESC (Press while BIOS is updating memory size on screen.)

Power-on Self Test (POST)

Each time you turn on the system, POST starts running. POST checks the carriers, processors, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory it is able to access and test. The length of time needed to test memory depends on the amount of memory installed. POST is stored in flash memory.

1. Turn on your video monitor and system. After a few seconds, POST begins to run.
2. After the memory test, these screen prompts and messages appear:
   ```
   Keyboard Detected
   Mouse Initialized
   Press <F2> to enter Setup
   ```
3. If you do not press <F2> and do NOT have a device with an OS loaded, the above message remains for a few seconds while the boot process continues, and the system beeps once. Then this message appears:
   ```
   Operating System not found
   ```
   (To create software installation diskettes, see the printed *Quick Start Guide*.)

   If you do not press <F2>, the boot process continues and this message appears:
   ```
   Press <Ctrl> <C> to enter SCSI Utility
   ```
4. Press <Ctrl+C> if SCSI devices are installed. When the utility opens, follow the displayed instructions to configure the onboard SCSI host adapter settings and to run the SCSI utilities. Also see "Using the QLogic SCSI Utility" on page 80. If you do not enter the SCSI utility, the boot process continues.
5. Press <Esc> during POST to access a boot menu when POST finishes. From this menu, you can choose the boot device or enter BIOS Setup.

After POST completes, the system beeps once.

What appears next on the screen depends on if you have an OS loaded on the server (or which OS).

If the system halts before POST completes running, it emits a beep code indicating a critical system error that requires immediate attention. If POST can display a message on the video display screen, the speaker beeps twice as the message appears.

Note the screen display and write down the beep code you hear; this information is useful for your service representative. For a listing of beep codes and error messages that POST can generate, see Chapter 7, "Solving Problems," beginning on page 155.

Using BIOS Setup

This section describes BIOS Setup options. Use Setup to change the system configuration defaults. You can run Setup with or without an OS being present. Setup stores most of the configuration values in battery-backed CMOS; the rest of the values are stored in flash memory. The values take effect when you boot the system. POST uses these values to configure the hardware; if the values and the actual hardware do not agree, POST generates an error message. You must then run Setup to specify the correct configuration.

Run Setup: you can run Setup to modify any standard PC AT[†] feature such as:

- Select diskette drive
- Select parallel port
- Select serial port
- Set time/date (to be stored in RTC)
- Configure IDE hard drive
- Specify boot device sequence
- Enable SCSI BIOS

Run SSU, not Setup: You must run the SSU instead of Setup to do the following:

- Enter or change information about a board
- Alter system resources (e.g., interrupts, memory addresses, I/O assignments) to user-selected choices instead of choices selected by the BIOS resource manager

Record Your Setup Settings

Worksheets for recording your settings are in Appendix B, "Equipment Log and Configuration Worksheets", starting on page 197. If the default values ever need to be restored (after a CMOS clear, for example), you must run Setup again. Referring to the worksheets could make your task easier.

If You Cannot Access Setup

If the diskette drive is misconfigured so that you cannot access it to run a utility from a diskette, you might need to clear CMOS memory. You must open the system, change a jumper setting, use Setup to check and set diskette drive options, and change the jumper back. For a step-by-step procedure, see "CMOS Clear Switch" on page 183.

Starting Setup

You can enter and start Setup under several conditions:

- When you turn on the system, after POST completes the memory test.
- When you reboot the system by pressing <Ctrl+Alt+Del> while at the DOS operating system prompt.
- When you have moved the CMOS switch to the "Clear CMOS" position (enabled); for a step-by-step procedure, see "CMOS Clear Switch" on page 183.

In the three conditions listed above, after rebooting, you will see this prompt:

```
Press <F2> to enter SETUP
```

In a fourth condition, when CMOS/NVRAM has been corrupted, you will see other prompts but not the <F2> prompt:

```
Warning:  cmos checksum invalid
```

```
Warning:  cmos time and date not set
```

In this condition, BIOS will load default values for CMOS and attempt to boot.

Setup Menus

Setup has six major menus and several submenus:

1. Main Menu
    - IDE submenu
    - Keyboard Features submenu
2. Advanced Menu
    - PCI Configuration submenu
        — PCI Mode submenu
    - I/O Device Configuration submenu
    - Advanced Chipset Control submenu
3. Security Menu
4. Server Menu
    - System Management submenu
    - Console Redirection submenu
5. Boot Menu
    - Boot Device Priority submenu
    - Hard Drive submenu
6. Exit Menu

When you see this:	What it means:
On screen, an option is shown but you cannot select it or move to that field.	You cannot change or configure the option in that menu screen. Either the option is autoconfigured or autodetected, or you must use a different Setup screen, or you must use the SSU.
On screen, the phrase Press Enter appears next to the option.	Press <Enter> to display a submenu that is either a separate full-screen menu or a pop-up menu with one or more choices.

The rest of this section lists the features that display onscreen after you press <F2> to enter Setup. Not all of the option choices are described, because (1) a few are not user-selectable but are displayed for your information, and (2) many of the choices are relatively self-explanatory.

Press	To
F1	Get help about an item.
ESC	Go back to a previous item.
↑	Select the previous value in a menu option list.
↓	Select the next value in a menu option list.
← →	Select a major menu.
-	Change the value of the current menu item to the previous value.
+	Change the value of the current menu item to the next value.
Enter	Activate submenus, select feature options, and change feature values.
F9	Display the following message:
	`Setup Confirmation`
	`Load default configuration now?`
	`[Yes]      [No]`
	The [Yes] button will be highlighted. If you press <Enter>, all Setup fields return to their default values. If you press <ESC> or select No, the server returns to the configuration it had before you pressed <F9>, without affecting any existing field values.
F10	Display the following message:
	`Setup Confirmation`
	`Save configuration changes and exit now?`
	`[Yes]      [No]`
	The [Yes] button will be highlighted. If you press <Enter>, all current Setup values are saved, and the system is reset. If you press <ESC> or select No, the server returns to the configuration it had before you pressed <F10>, without affecting any existing values.

Main Menu

Default values are in bold typeface.

Feature	Option	Description
System Time	HH:MM:SS	Sets the System Time.
System Date	MM/DD/YYYY	Sets the System Date.
Legacy Diskette A:	Disabled 360 KB, 5 ¼" 1.2 MB, 5 ¼" 720 KB, 3 ½" **1.44/1.25 MB, 3 ½"** 2.88 MB, 3 ½"	Selects the floppy diskette type for drive A.
Legacy Diskette B:	**Disabled** 360 KB, 5 ¼" 1.2 MB, 5 ¼" 720 KB, 5 ¼" 1.44/1.25 MB, 3 ½" 2.88 MB, 3 ½"	Selects the floppy diskette type for drive B.
Primary Master		Selects IDE submenu.
Primary Slave		Selects IDE submenu.
Processor Information		Selects Processor Information submenu.
Keyboard Features		Selects Keyboard Features submenu.
Language	**English (US)** French German Italian Spanish	Selects the language used by BIOS.

IDE Submenu

Default values are in bold typeface.

Feature	Option	Description
Type	None CD-ROM IDE Removable ATAPI Removable User **Auto**	If "Auto" is selected, BIOS determines the parameters during POST. If "User" is selected, BIOS Setup prompts the user to fill in the drive parameters. Drive types 1 through 39 are predetermined drive types.
Cylinders		Displays the number of cylinders.
Heads		Displays the number of read/write heads.
Sectors		Displays the number of sectors per track.
Maximum Capacity		Displays the capacity of the drive.
Multisector Transfers	**Disabled** 2 sectors 4 sectors 8 sectors 16 sectors	Displays status of multisector transfers. Autotyped by BIOS.
LBA Mode Control	**Disabled** Enabled	Displays status of Logical Block Access. Autotyped by BIOS.
32-bit I/O	**Disabled** Enabled	Enables 32-bit IDE data transfers.
Transfer Mode	**Standard** Fast PIO 1 Fast PIO 2 Fast PIO 3 Fast PIO 4	Selects the method for transferring data to/from the drive. Autotyped by BIOS.
Ultra-DMA Mode	**Disabled** Mode 0 Mode 1 Mode 2	Selects the Ultra-DMA mode used for transferring data to/from the drive. Autotyped by BIOS.

Processor Information Submenu

Item	Description
Board 1 Processor 1 Stepping ID	Displays the processor stepping.
Board 1 Processor 1 L2 Cache Size	Displays the L2 cache size.
Board 1 Processor 2 Stepping ID	Displays the processor stepping.
Board 1 Processor 2 L2 Cache Size	Displays the L2 cache size.
Board 1 Processor 3 Stepping ID	Displays the processor stepping.
Board 1 Processor 3 L2 Cache Size	Displays the L2 cache size.
Board 1 Processor 4 Stepping ID	Displays the processor stepping.
Board 1 Processor 4 L2 Cache Size	Displays the L2 cache size.
Board 2 Processor 1 Stepping ID	Displays the processor stepping.
Board 2 Processor 1 L2 Cache Size	Displays the L2 cache size.
Board 2 Processor 2 Stepping ID	Displays the processor stepping.
Board 2 Processor 2 L2 Cache Size	Displays the L2 cache size.
Board 2 Processor 3 Stepping ID	Displays the processor stepping.
Board 2 Processor 3 L2 Cache Size	Displays the L2 cache size.
Board 2 Processor 4 Stepping ID	Displays the processor stepping.
Board 2 Processor 4 L2 Cache Size	Displays the L2 cache size.

Keyboard Features Submenu

Default values are in bold typeface.

Feature	Option	Description
Num Lock	**Auto** On Off	Selects power-on state for Num Lock key.
Key Click	**Disabled** Enabled	Enables key click.
Keyboard auto-repeat rate	**30/sec** 26.7/sec 21.8/sec 18.5/sec 13.3/sec 10/sec 6/sec 2/sec	Selects key repeat rate.
Keyboard auto-repeat delay	1/4 sec **1/2 sec** 3/4 sec 1 sec	Selects delay before key repeat.

Advanced Menu

Default values are in bold typeface.

⚠ WARNING

Setting items on this menu to incorrect values may cause your system to malfunction.

Feature	Option	Description
Processor Serial Number	Disabled **Enabled**	Enables or disables the Processor Serial Number feature of the Pentium III Xeon processor.
Reset Configuration Data	**No** Yes	If "Yes" is selected, BIOS clears the System Configuration Data during the next boot. The field is automatically reset to "No" in next boot.
Use Multiprocessor Specification	1.1 **1.4**	Selects the version of the Multiprocessor Specification to use. Some operating systems require version 1.1 for compatibility reasons.
Large Disk Access Mode	CHS **LBA**	Select the drive access method for IDE drives. Most operating systems use Logical Block Addressing (LBA). However, some operating systems may use the Cylinder Head Sector (CHS). See your operating system documentation for more information.
Pause Before Boot	**Disabled** Enabled	If enabled, BIOS pauses five-seconds before booting the operating system.
Hot-plug PCI Master Control	**Disabled** Enabled	Set to "Enable" to create the Hot-plug PCI Resource Table and to reserve resources for each hot-plug PCI slot.
Hot-plug PCI Allocation Level	Disabled: **Min**. Max.	Set amount of resources to allocate to empty hot-plug PCI slots.
Timeout on POST errors	**Disabled** Enabled	If enabled, boots operating system after 5 seconds of displaying POST errors. If disabled, waits for user to press F1 or F2.
PCI Configuration		Selects PCI Configuration submenu.
I/O Device Configuration		Selects I/O Device Configuration submenu.
Advanced Chipset Control		Selects Advanced Chipset Control submenu.

PCI Configuration Submenu

Default values are in bold typeface.

Feature	Option	Description
Processor Bus	100 MHz	Displays the clock speed of the Processor Bus.
PCI Slots 1-2	PCI 33	Displays the clock speed and setting of PCI Segment A.
PCI Slots 3-6	PCI 33	Displays the clock speed and setting of PCI Segment B.
PCI Slots 7-8	PCI 33 PCI 66 PCI-X 66 PCI-X 100	Displays the clock speed and setting of PCI Segment C.
PCI Slots 9-10	PCI 33 PCI 66 PCI-X 66 PCI-X 100	Displays the clock speed and setting of PCI Segment D.
PCI Bus Default	**PCI 33** PCI 66 PCI-X 66 PCI-X 100	If no cards are present behind a PCI-X capable bus, this selects the capabilities of that empty bus. If cards are present, this option is ignored and the slot speed is automatically determined.
PCI Device, Embedded SCSI		Selects PCI Mode submenu for the embedded LVDS controller.
PCI Slot 1		Selects PCI Mode Submenu for this PCI slot.
PCI Slot 2		Selects PCI Mode Submenu for this PCI slot.
PCI Slot 3		Selects PCI Mode Submenu for this PCI slot.
PCI Slot 4		Selects PCI Mode Submenu for this PCI slot.
PCI Slot 5		Selects PCI Mode Submenu for this PCI slot.
PCI Slot 6		Selects PCI Mode Submenu for this PCI slot.
PCI Slot 7		Selects PCI Mode Submenu for this PCI-X slot.
PCI Slot 8		Selects PCI Mode Submenu for this PCI-X slot.
PCI Slot 9		Selects PCI Mode Submenu for this PCI-X slot.
PCI Slot 10		Selects PCI Mode Submenu for this PCI-X slot.

PCI Mode Submenu

Default values are in bold typeface.

Feature	Option	Description
Option ROM Scan	Disabled **Enabled**	Enables option ROM scan.
Enable Master	Disabled **Enabled**	Enables device(s) as a PCI bus master.
Latency Timer	Default 0020h 0040h 0060h **0080h** 00A0h 00C0h 00E0h	Specifies the minimum guaranteed number of PCI bus clocks that a device can master on a PCI bus during one transaction.

I/O Device Configuration Submenu

Default values are in bold typeface.

Feature	Option	Description
Serial Port A	Disabled **Enabled** Auto	If set to "Auto", BIOS configures the port.
Base I/O Address	**3F8h** 2F8h 3E8h 2E8h	Selects the base I/O address for COM port A.
Interrupt	IRQ3 **IRQ4**	Selects the IRQ for COM port A.
Serial Port B	Disabled **Enabled** Auto	If set to "Auto", BIOS configures the port.
Base I/O Address	3F8h **2F8h** 3E8h 2E8h	Selects the base I/O address for COM port B.
Interrupt	**IRQ3** IRQ4	Selects the IRQ for COM port B.
Parallel Port	Disabled **Enabled** Auto	If set to "Auto", BIOS configures the port
Mode	Output only **Bidirectional** EPP ECP	Selects the mode of the LPT port.
Base I/O Address	**378h** 278h 178h 3BCh	Selects the base I/O address for LPT port. 178h is only available when the LPT port is in EPP mode. Otherwise, 3BCh is available.
Interrupt	IRQ5 **IRQ7**	Selects the IRQ for LPT port.
DMA channel	DMA 1 **DMA 3**	Selects the DMA channel for LPT port when configured for ECP mode.
Floppy disk controller	Disabled **Enabled** Auto OS Controlled	Enables embedded floppy disk controller.

Advanced Chipset Control Submenu

Default values are in bold typeface.

Feature	Option	Description
Extended RAM Step	**1 MB** 1 KB Every location	Selects the thoroughness of the extended memory test. If "1 MB" is selected, BIOS tests each 1 MB boundary. If "1KB" is selected, BIOS tests each 1 KB boundary. If "Every location" is selected, BIOS tests every byte. BIOS defaults to the fastest test.
L2 Cache	Disabled **Enabled**	Enables the second level cache. The second level cache should be disabled only for diagnostic purposes.
Multiboot Support	**Disabled** Enabled	Enables Boot Device Selection.
Override PHP Switches	**Disabled** Enabled	If enabled, the individual slot switches cannot power down the slots. If disabled, the power to each slot can be removed by the individual slot switches.
2 GB Memory Limit	**Disabled** Enabled	If enabled, BIOS limits the top of memory to 2 GB. Additional memory becomes inaccessible.

Security Menu

Default values are in bold typeface.

Feature	Option	Description
User Password Is	Set **Clear**	Status only. Administrator password must be enabled before user password can be enabled. User password is enabled by entering a user password and disabled by entering a null user password.
Administrator Password Is	Set **Clear**	Status only. Enabled by entering an administrator password and disabled by entering a null administrator password.
Set User Password	Press Enter	When the Enter key is pressed, the user is prompted for a password; press ESC key to abort.
Set Administrator Password	Press Enter	When the Enter key is pressed, the user is prompted for a password; press ESC key to abort.
Password on Boot	**Disabled** Enabled	Requires password entry on boot. The system remains in Secure Mode until password is entered. Password on Boot takes precedence over Secure Mode Boot.
Secure Mode Timer	**Disabled** 1 min 2 min 5 min 10 min 20 min 1 hr 2 hr	Sets the period of key/PS2 mouse inactivity specified before Secure Mode activates. Requires a password for Secure Mode to function.
Secure Mode Hot Key (Ctrl+Alt+X)	**Disabled** ["X" = A-Z]	Assigns a hot key that invokes Secure Mode.
Secure Mode Boot	**Disabled** Enabled	Enabled system boots in the secure mode. Requires a password to unlock the system.
Video Blanking	**Disabled** Enabled	Blank video when Secure Mode is activated. Requires a password to unlock the system.
Floppy Write Protect	**Disabled** Enabled	When Secure Mode is activated, the floppy drive is write-protected. Requires a password to re-enable floppy writes.
Front Panel Lockout	**Disabled** Enabled	When Secure Mode is activated, the Reset and Power switches are locked. Requires a password is required to unlock the system.

Server Menu

Default values are in bold typeface.

Feature	Option	Description
System Management		Selects System Management submenu.
Console Redirection		Selects Console Redirection submenu.
Processor Retest	**No** Yes	Select "Yes" to clear historical processor status and retest all processors on the next boot.
EMP Password Switch	**Disabled** Enabled	Enables the EMP password.
EMP Password		Selects the EMP password.
EMP ESC Sequence		Updated from the Front Panel Controller firmware.
EMP Hangup Line String		Updated from the Front Panel Controller firmware.
Modem Initialization String		Updated from the Front Panel Controller firmware.
High Modem Initialization String		Updated from the Front Panel Controller firmware.
EMP Access Mode	Preboot Only Always Active **Disabled**	Selected when the EMP is enabled. Preboot Only: EMP is enabled during power down or POST only. Always Active: EMP is always enabled. Disabled: EMP is disabled.
EMP Restricted Mode Access	**Disabled** Enabled	Enables Restricted Mode. In Restricted Mode, Power Down, Front Panel NMI, and Reset Control via EMP are disabled.
EMP Direct Connect/Modem Mode	**Direct Connect** Modem Mode	Allows the user to connect to a local machine without using a modem.

System Management Submenu

Default values are in bold typeface.

Feature	Option	Description
Firmware SMIs	Disabled **Enabled**	Enables SMI generation by agents on the Intelligent Platform Management Bus (IPMB). Because BIOS requires SMIs for various tasks, setting this field to disabled does not disable all sources of SMIs.
System Event Logging	Disabled **Enabled**	Enabled: logs critical system events.
Clear Event Log	**Disabled** Enabled	Clears the System Event Log (SEL). This option is reset to Disabled on each boot.
Memory Scrubbing	**Disabled** Enabled	Enables memory scrubbing by the Profusion chip set.
AERR Enable	Disabled **Enabled**	Enables AERR to be asserted on the processor host buses.
Assert NMI on BERR	Disabled **Enabled**	Enables BERR to be reported as a critical event via NMI. Requires SERR to be enabled as well.
Assert NMI on PERR	Disabled **Enabled**	Enables PERR to be reported as a critical event via NMI. Requires SERR to be enabled as well.
Assert NMI on SERR	Disabled **Enabled**	Enables SERR to be reported as a critical event via NMI.
Enable Host Bus Error	Disabled **Enabled**	Enables ECC checking on the processor buses.
FPC Error Check	**Disabled** Enabled	Enables Front Panel Controller (FPC) checking. If enabled, BIOS verifies that it can communicate with the FPC.
HSC Error Check	**Disabled** Enabled	Enables Hot-swap Controller (HSC) checking. If enabled, BIOS verifies that it can communicate with the HSC.
Server Management Information		Selects Server Management Information submenu.

Server Management Information Submenu

Feature	Option	Description
Board Part Number		Displays Board Part Number.
Board Serial Number		Displays Board Serial Number.
System Part Number		Displays System Part Number.
System Serial Number		Displays System Serial Number.
Chassis Part Number		Displays Chassis Part Number.
Chassis Serial Number		Displays Chassis Serial Number.
BMC Revision		Displays Baseboard Management Controller Revision.
FPC Revision		Displays Front Panel Controller Revision.
HSC Revision		Displays Hot-swap Controller Revision.

Console Redirection Submenu

Feature	Option	Description
COM Port Address	**Disabled** 3F8 2F8 3E8	When enabled, use the I/O port specified.
IRQ #	**3** 4	When enabled, use the IRQ specified.
COM Port Baud Rate	**9600 K** 19.2 K 38.4 K 115.2 K	When enabled, use the baud rate specified. The maximum baud rate supported by the Emergency Management Port is 19.2K.
Flow Control	No Flow Control CTS/RTS XON/XOFF **CTS/RTS + CD**	When enabled, use the flow control type specified.

Boot Menu

Boot Menu options allow the user to select the boot device. The following table shows an example list of devices ordered in priority of the boot invocation. Items can be reprioritized by using the Up and Down arrow keys to select the device. Once the device is selected, use the + (plus) key to move the device higher in the boot priority list. Use the – (minus) key to move the device lower in the boot priority list.

Feature	Option	Description
Floppy Check	**Disabled** Enabled	Disabled speeds up the boot process. Enabled verifies the floppy type on boot.
Boot Device Priority		Selects the Boot Device Priority submenu.
Hard Drive		Selects the Hard Drive submenu.
Removable Devices		Selects the Removable Devices submenu.
Removable Format		Selects the Removable Format submenu.
Maximum Number of I_2O Drives	**1** 4	Selects the maximum number of I_2O drives that will be assigned a DOS drive.
Message Timeout Multiplier	**1** 2 4 8 10 50 100 1000	All I_2O message timeout values are multiplied by this number.
Pause During POST	**Disabled** Enabled	Use this to start the IRTOS (I_2O Real-time Operating System) manually. When POST has stopped, it issues three beeps. Press any key to continue POST.

Exit Menu

The following menu options are available on the Server menu. Select an option by using the Up or Down arrow keys. Then press <Enter> to execute the option, and follow the prompts.

Option	Description
Exit Saving Changes	Exit Setup and save changes.
Exit Discarding Changes	Exit Setup without saving changes.
Load Setup Defaults	Load default values for all Setup items.
Load Custom Defaults	Load settings from Custom Defaults.
Save Custom Defaults	Save changes as Custom Defaults. If CMOS fails, BIOS uses Custom Defaults if available. If not, it uses the factory defaults.
Discard Changes	Load previous values of all Setup items.
Save Changes	Save all changes.

Using the System Setup Utility (SSU)

The SSU is on the configuration software CD-ROM shipped with the server. The SSU provides a graphical user interface (GUI) over an extensible framework for server configuration. The SSU framework supports the following functions and capabilities:

- Assigns resources to devices and add-in boards before loading the OS.
- Lets you specify boot device order and system security options.
- Permits viewing and clearing of the system event log (SEL).
- Permits viewing of the system field replaceable units (FRUs) and sensor data records (SDRs).
- Allows troubleshooting of the server when the OS is not operational.
- Provides a system-level view of the server I/O devices.
- Supports saving and restoring system configuration.

When to Run the SSU

The SSU is a DOS-based utility that supports extended system configuration operations for onboard resources and add-in boards. You can also view the SEL and set system boot and security options. Use the SSU when you need to:

- Add and remove boards affecting the assignment of resources (ports, memory, IRQs, DMA).
- Modify the server's boot device order or security settings.
- Change the server configuration settings.
- Save the server configuration.
- View or clear the SEL.
- View FRU information.
- View the SDR table.

The SSU is PCI-aware and works with any compliant configuration (.CFG) files supplied by the peripheral device manufacturer.

The I/O carrier comes with a .CFG file describing the characteristics of the carrier and the system resources it requires.

To specify a system configuration, SSU uses the information provided by:

- .CFG files.
- Configuration registers.
- Flash memory.
- The information that you enter.

The SSU then writes the configuration information to flash memory.

The SSU stores configuration values in flash memory. These values take effect when you boot the server. POST checks the values against the actual hardware configuration; if the values do not agree, POST generates an error message. You must then run the SSU to specify the correct configuration before the server boots.

The SSU always includes a checksum with the configuration data so BIOS can detect any potential data corruption before the actual hardware configuration occurs.

What You Need to Do

You can run the SSU directly from the configuration software CD-ROM after you have installed a CD-ROM drive, or from a set of DOS diskettes.

If you choose to run the SSU from DOS diskettes, you must copy the SSU from the CD-ROM to the diskettes and follow the instructions in the included README.TXT file to prepare the diskettes.

If your diskette drive is disabled or improperly configured, you must use the flash-resident Setup utility to enable it so you can use the SSU. If necessary, you can disable the drive after exiting the SSU. Information entered using the SSU overrides any entered using Setup.

Running the SSU

Running the SSU Locally

Running the ssu.bat file provided on the SSU media starts the SSU. If the server boots directly from the SSU media, the ssu.bat file runs automatically. If the server boots from different media, the SSU can be started manually or by another application. When the utility starts in the local execution mode (the default mode), the SSU accepts input from the keyboard and/or mouse. The SSU presents a VGA-based GUI on the primary monitor.

The SSU runs from writable, nonwritable, removable, and nonremovable media. If the SSU is run from nonwritable media, user preference settings (like screen colors) cannot be saved.

The SSU supports the ROM-DOS V6.22 OS. It can run on other ROM-DOS compatible OSs, but they are not supported. The SSU will not operate from a "DOS window" running under an OS like Windows[†].

Running the SSU Remotely

To run the SSU remotely, you must use one of two mechanisms:

- Graphical hardware redirection through the Intel remote management card (IRMC)
- BIOS console redirection

⟹ **NOTE**

> The SSU supports a text mode of operation versus the default VGA graphics mode. Some forms of remote operation require that the SSU be operated in text mode. In text mode, the SSU screens are constructed using only character-based graphics and colors. The primary benefit of text mode is the reduced amount of display information that needs to be communicated to a remote console. Support for text mode operation also allows the SSU to be operated remotely via modem using existing technologies, with no modification to the SSU required.

> To start the SSU in text mode, type "AF/t" from the command line in the SSU subdirectory (the directory containing the af.exe file). Depending on the mode of execution, this could involve exiting the SSU to reach the command prompt, then restarting the SSU in text mode.

Graphical Hardware Redirection through the Intel Remote Management Card (IRMC)

Using graphical hardware redirection through the IRMC, you can:

- See the SSU console in VGA graphics mode.
- Control the mouse.
- Control the keyboard from a local system connected to a remote server by a network or modem.

The IRMC provides video memory, keyboard, and mouse redirection support. Video memory and user input is sent to a remote location through either a modem or Ethernet link and displayed by the remote control console. This solution requires an IRMC board installed in the remote server and the remote control software available on the local system. In this model of remote operation, the SSU executes exclusively on the remote server. Any files required for the SSU to execute must be on the remote server (on removable or nonremovable media). Downloading the SSU to a remote server is not explicitly supported by the SSU, but using a third-party software package to download the required SSU files to the remote server is not prohibited.

BIOS Console Redirection

Using BIOS console redirection, you can:

- See the SSU console.
- Control the keyboard from a local system connected to a remote server by a modem or direct serial connection.

The local system must run terminal emulator software capable of supporting ANSI terminal sequences. BIOS console redirection provides text mode video and keyboard redirection support only. It does not support redirection of the mouse.

Text mode video and user input is sent to a remote location through either a modem or direct serial link and is displayed by the terminal emulator software on the local system.

In this model of remote operation, the SSU executes in text mode exclusively on the remote server. Any files required for the SSU to execute must be on the remote server (on removable or nonremovable media).

Direct Platform Control (DPC) Console

Using the DPC console in conjunction with BIOS console redirection, you can:

- See the BIOS Setup Screen (F2)
- Control the keyboard from a local system connected to a remote server by a modem or direct serial connection

The local system must be running the DPC console software. This method of redirection provides text mode video and keyboard redirection support only. It does not support redirection of the mouse.

For specific instructions on implementing the DPC console, see "Direct Platform Control (DPC) Console" on page 63.

Starting the SSU

The SSU is a collection of task-oriented modules plugged into a common framework called the Application Framework (AF). The AF provides a launching point for individual tasks and a location for setting customization information.

1. Turn on your video monitor and your system.
2. Start the SSU through one of two ways:
   - **After creating a set of SSU diskettes from the CD-ROM:** Insert the first SSU diskette in drive A. Press the reset button or <Ctrl+Alt+Del> to reboot your server from the diskette.
   - **Directly from the Server Configuration Software CD-ROM:** Insert the configuration software CD-ROM into your CD-ROM drive. Press the reset button or <Ctrl-Alt-Del> to reboot. When prompted to do so, press <F2> to enter BIOS Setup. From the Boot Menu, select the Boot Device Priority option. Select CD-ROM as your primary boot device. Save those settings and exit BIOS Setup. The server will boot from the CD-ROM and display a menu of options. Follow the instructions in the menu to start the SSU.
3. When the SSU title appears on the screen, press <Enter> to continue.
4. The mouse driver loads if it is available; press <Enter> to continue.

   This message appears:

   ```
   Please wait while the Application Framework loads....
   ```

   When the main window of the SSU appears, you can customize the GUI before continuing. See "Customizing the SSU" on page 55.
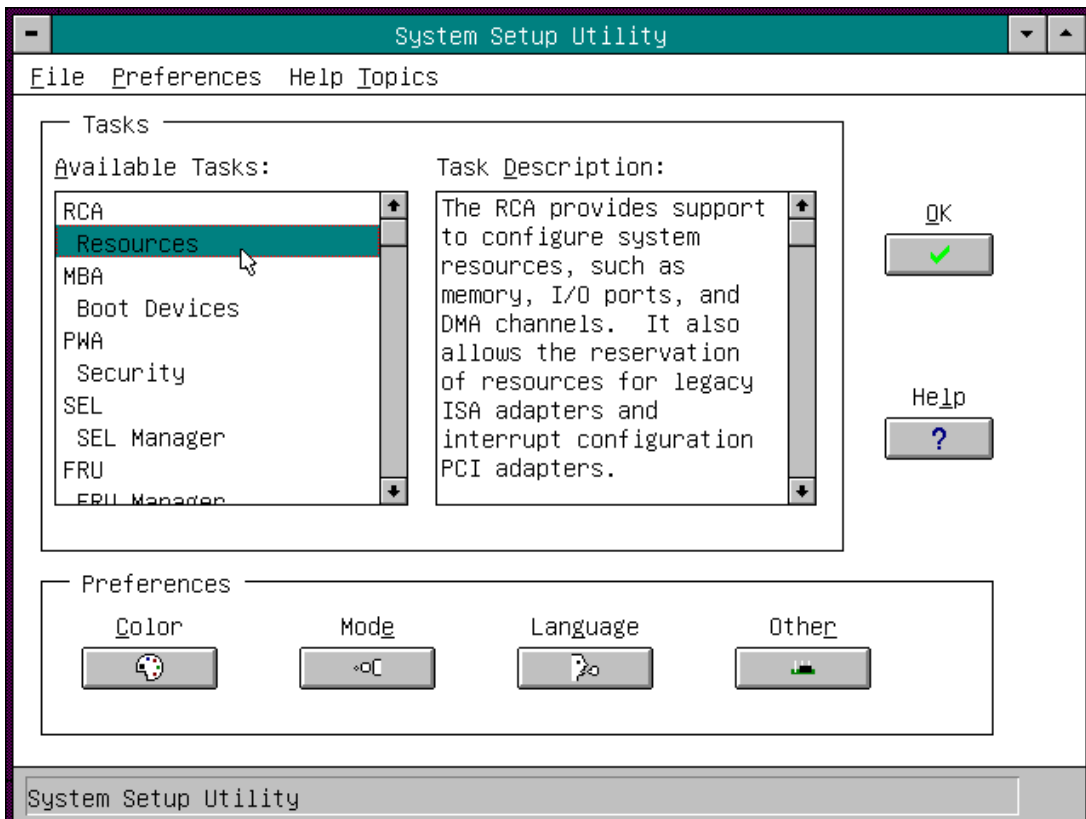
Figure 5. SSU Main Window

Customizing the SSU

You can customize the GUI according to your preferences. The AF sets these preferences and saves them in the AF.INI file so that they take effect the next time you start the SSU. Use these six user-customizable settings:

- **BackColor**—(default = 3) lets you change the BACKGROUND color associated with different items on the screen to predefined color combinations. The changes are instantaneous.
- **Color**—(default = 0) lets you change the WINDOW color preference selection to predefined color combinations. The changes are instantaneous.
- **UserMode**—(default = expert) lets you set the desired expertise level.
  - — Novice
  - — Intermediate
  - — Expert

  The expertise level determines which tasks are visible in the Available Tasks section and what actions each task performs. For a new mode setting to take effect, you must exit the SSU and restart it. In the current implementation, there is no distinction between these three different modes.
- **Language**—(default = EN) lets you change the text displayed in the SSU to the appropriate language. For a new language setting to take effect, you must exit the SSU and restart it. For a list of Alpha-2 language codes, see the *ISO 639:1988* and *ISO 3166-1993* specifications.
- **Locale**—(default = US) lets you change the current locale used in the SSU environment. For a new locale to take effect, you must exit the SSU and restart it. For a list of Alpha-2 locale codes, see the *ISO 639:1988* and *ISO 3166-1993* specifications.
- **Other**—lets you change other miscellaneous options in the SSU. The changes are immediate.

To change the interface default values:

- Use the mouse to click the proper button in the Preferences section of the SSU Main window.

  OR
- Use the tab and arrow keys to highlight the desired button, and press the spacebar or <Enter>.

  OR
- Access the menu bar with the mouse or hot keys (Alt + underlined letter).

⟹ **NOTE**

> If you run the SSU from nonwritable media (like a CD-ROM), these
> preferences will be lost when you exit the SSU.

Launching a Task

It is possible to have many tasks open at the same time, although some tasks might require complete control to avoid possible conflicts. A task achieves complete control by commanding the center of operation until you close the task window.

To launch a task:

- In the SSU Main window, double-click the task name under Available Tasks to display the main window for that task, OR
- Highlight the task name, and click <OK>, OR
- Use the tab and arrow keys to highlight the desired button, and press the spacebar or <Enter>.

Resource Configuration Add-In (RCA) Window

The RCA provides three major functions:

- Creates representations of devices that cannot be discovered by the system.
- Modifies the contents of the system by adding and removing devices.
- Modifies the resources used by devices.

1. From the SSU main window, launch the RCA by selecting the "Resources" task under the RCA heading in the task box.
2. When the RCA window appears, it displays messages similar to the following:
   ```
   Baseboard:  System Board
   PCI Card: Bus 00 dev 00 -- Host Processor Bridge
   PCI Card: Bus 00 dev 0D -- Multifunction Controller
   PCI Card: Bus 00 dev 0F -- Ethernet Controller
   PCI Card: Bus 00 dev 12 -- Multifunction Controller
   PCI Card: Bus 00 dev 14 -- VGA Controller
   ```
3. To configure a device, click it or select its name in the Devices section of the RCA window, and press the spacebar or <Enter>.
4. You can close the RCA window and return to the AF by clicking on the Close button. Any changes made will be kept in memory for use by the RCA when it is rerun.
5. Save all changes by clicking <Save>. Saving writes your current configuration to nonvolatile storage where it will be available to the system after every reboot.
6. To discard all changes, close the window by clicking on the system menu (the dash in the upper-left corner). Do not do this if you want to save changes (step 5).

Modifying Resources

You might need to modify the resources of a device to accommodate certain OSs, applications, and drivers. You might also need to modify resources to resolve a conflict.

To modify the resources associated with a device:

1. Highlight the device in the Devices section of the RCA window.
2. Press the spacebar or <Enter>, or double-click the entry.

This displays the functions of the selected device along with possible choices and the resources associated with those choices.

To make a modification:

1. Highlight the function in the Configuration window.
2. Press the spacebar or <Enter>, or double-click the entry (this updates the choice and resource lists).
3. Press the tab key to get to the choice list, and press <Enter>.
4. Use the arrow keys to select a proper choice, and press <Enter> again.
5. If the choice allows multiple possible values for a particular resource, use the hot key to select a resource and press the spacebar or double-click the resource.
6. Select the desired resource, and click <OK>.

System Resource Usage

Click <Resource Use> in the Configuration window to display the System Resource Usage window, which shows the resources each device consumes. This information is useful if a conflict occurs. Devices can be organized according to the resources you want to examine using the options in the Resource section of the screen. The resource information can also be written to a plain text file through this window.

Multiboot Options Add-In

In this window, you can change the boot priority of a device.
1. Select a device.
2. Press <+> to move the device up in the list (higher priority). Press <-> to move it down.

Security Add-In

In this window, you can set the user and administrator passwords and security options.

To Set the User Password

1. Click <User Password>.
2. Enter the password in the first field.
3. Confirm the password by entering it again in the second field.

To Change or Clear the User Password

1. Click <User Password>.
2. Enter the old password in the first field.
3. Enter the new password in the second field (or leave blank to clear).
4. Confirm the password by entering it again in the second field (or leave blank to clear).

To Set the Administrator Password

1. Click <Administrator Password>.
2. Enter the password in the first field.
3. Confirm the password by entering it again in the second field.

To Change or Clear the Administrator Password

1. Click <Administrator Password>.
2. Enter the old password in the first field.
3. Enter the new password in the second field (or leave blank to clear).
4. Confirm the password by entering it again in the second field (or leave blank to clear).

Security Options

The security options available to you depend on your platform. The list below is representative. Click <Options> to set the security options:

- **Hot Key**—sets a key sequence that puts the server into secure mode when the key is pressed.
- **Lock-Out Timer**—sets an interval that puts the server into secure mode when no activity occurs during the interval.
- **Secure Boot Mode**—forces the server to boot directly into secure mode.
- **Video Blanking**—turns off the video when the server is in secure mode.
- **Floppy Write**—controls access to the diskette drive when the server is in secure mode.
- **Front Panel Lockout**—control the power and reset button while the server is in secure mode.

System Event Log (SEL) Viewer Add-In

Clicking on the SEL add-in task brings up the SEL viewer add-in, which allows you to:

- Examine SEL records via the baseboard management controller (BMC) in hex or verbose mode.
- Examine SEL records by sensor or event type in hex or verbose mode.
- Examine SEL records from a previously stored binary file in hex or verbose mode.
- Save SEL records to a file in either text or binary form.
- Clear SEL entries from the nonvolatile storage area.

The SEL viewer main window provides access to features of the add-in. Each option included on the main menu supports an accelerator key. Accelerator keys are indicated by an underlined letter in the text listing the option. The main window includes support to display the following information for each SEL entry:

- Record identifier
- Event type
- Time stamp information
- Generator identifier
- Emv revision
- Sensor type
- Sensor number
- Event description

Figure 6 shows the SEL viewer main window. Table 7 lists the window's menus and options.
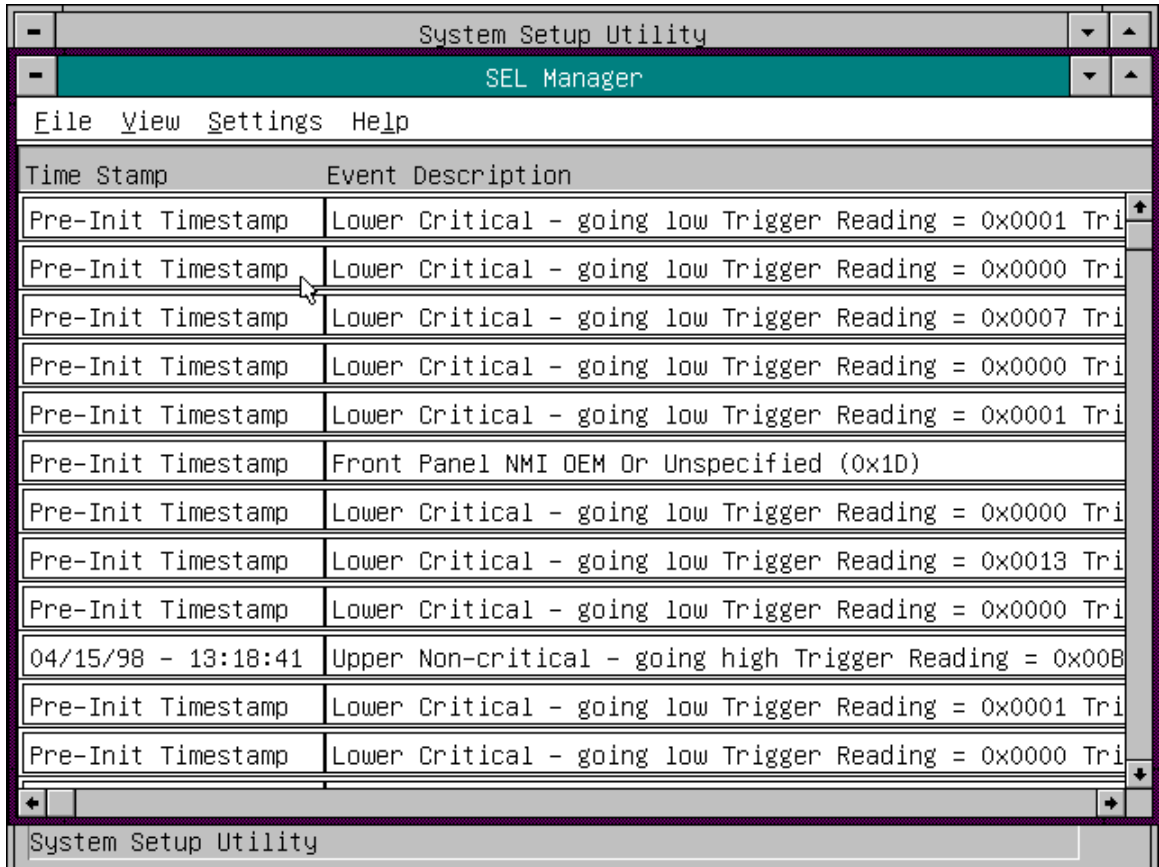

Figure 6. SEL Viewer Add-in Main Window

Table 7.   SEL Viewer Menus

Menu	Options
File	Open SEL: Views data from previously saved SEL file. Save SEL: Saves the currently loaded SEL data to a file. Clear SEL: Clears the SEL data from the BMC. Exit: Quits the SEL Viewer.
View	SEL Info: Displays information about the SEL (display only). All Events: Displays the current SEL data from the BMC. By Sensor: Displays a pop-up menu allowing you to view the data from a certain sensor type. By Event: Displays a pop-up menu allowing you to view the data from a certain event type. Monitor Real-time: Displays SEL information in real time, allowing you to continuously monitor the SEL (events are displayed as soon as they are posted to the SEL).
Settings	Display Hex/Verbose: Toggles between hex/interpreted mode of displaying the SEL records. Output Text/Binary: Determines whether SEL data will be saved to the file (and under File\Save) in binary format or verbose format.
Help	About: Displays the SEL Viewer version information.

Sensor Data Record (SDR) Manager Add-In

The SDR Manager can display SDR records in either raw form (hexadecimal) or in an interpreted, easy-to-understand textual form (verbose).

In this window, you can:

- Examine all SDR records through the baseboard management controller (BMC) in either hex or verbose mode.
- Examine SDR records by Record type in either hex or verbose mode.
- Examine SDR records from a previously stored binary file in either hex or verbose mode.
- Save the SDR records to a file in either text or binary form.

The SDR Manager main window provides access to features of the add-in through menus. Each option included on the main menu supports an accelerator key. Accelerator keys are indicated by an underlined letter in the text listing the option.

Figure 7 shows the SDR Manager main window. Table 8 lists the window's menus and options.
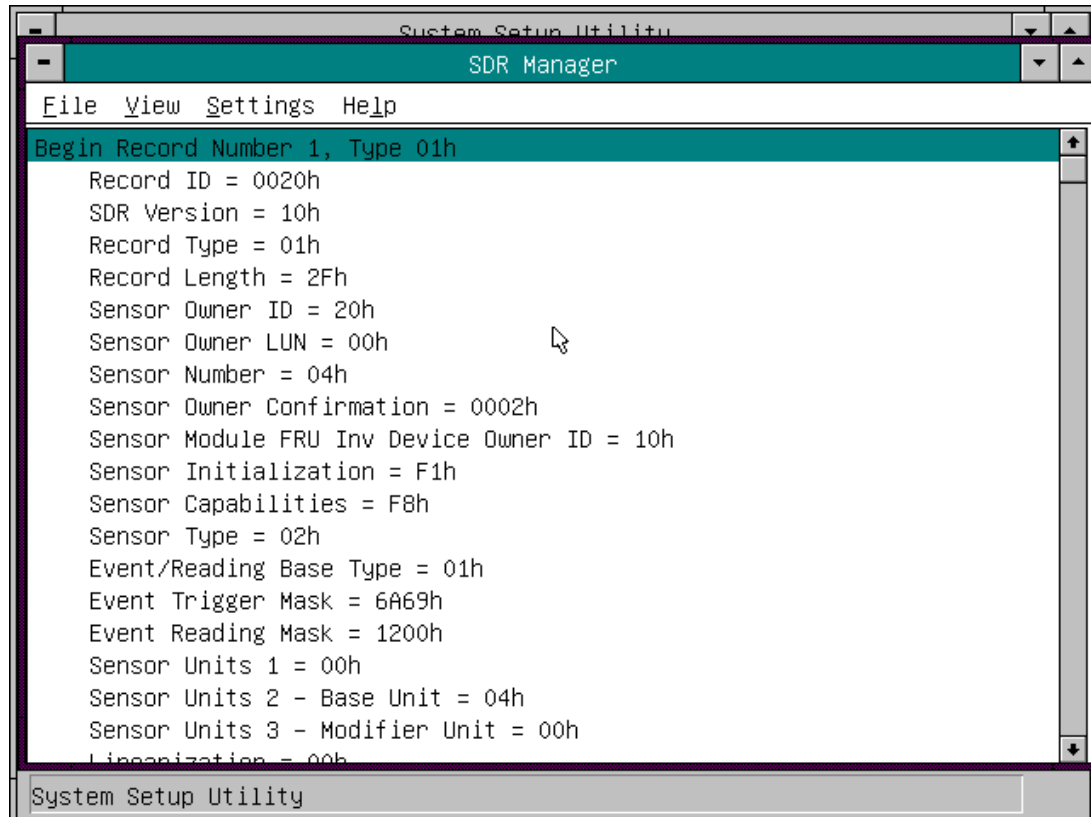

Figure 7. SDR Manager Main Window

Table 8.   SDR Manager Menus

Menu	Options
File	**Open FRU**: Opens FRU data from a previously saved file. **Save SDR**: Saves SDR data to a file in binary raw or verbose text format. **Exit**: Quits the SDR Manager.
View	**SDR Info**: Displays SDR information as returned by the GetSDRInfo interface of the BMC. **All Records**: Displays all records in the SDR repository. **By Record**: Displays all records in the SDR repository, sorted by record type.
Settings	**Display Hex**: Displays SDR records in hex format. **Display Verbose**: Displays SDR records in verbose format. **Output Text**: Saves SDR data in verbose format. **Output Binary**: Saves SDR data in binary format.
Help	**About**: Displays SDR Manager version information.

Field Replaceable Unit (FRU) Manager Add-In

The FRU Manager can display the FRU inventory areas in either hex or verbose format.

In this window you can:

- Examine all FRU inventory areas on the server in either hex or verbose mode.
- Examine individual FRU inventory areas in either hex or verbose mode.
- Examine FRU inventory of the BMC only in either hex or verbose mode.
- Save the FRU inventory areas to a file in either text or binary form for the BMC only.

The FRU manager's main window provides access to features of the add-in through menus. Each option included on the main menu supports an accelerator key. Accelerator keys are indicated by an underlined letter in the text listing the option.

Figure 8 shows the FRU Manager main window. Table 9 lists the window's menus and options.
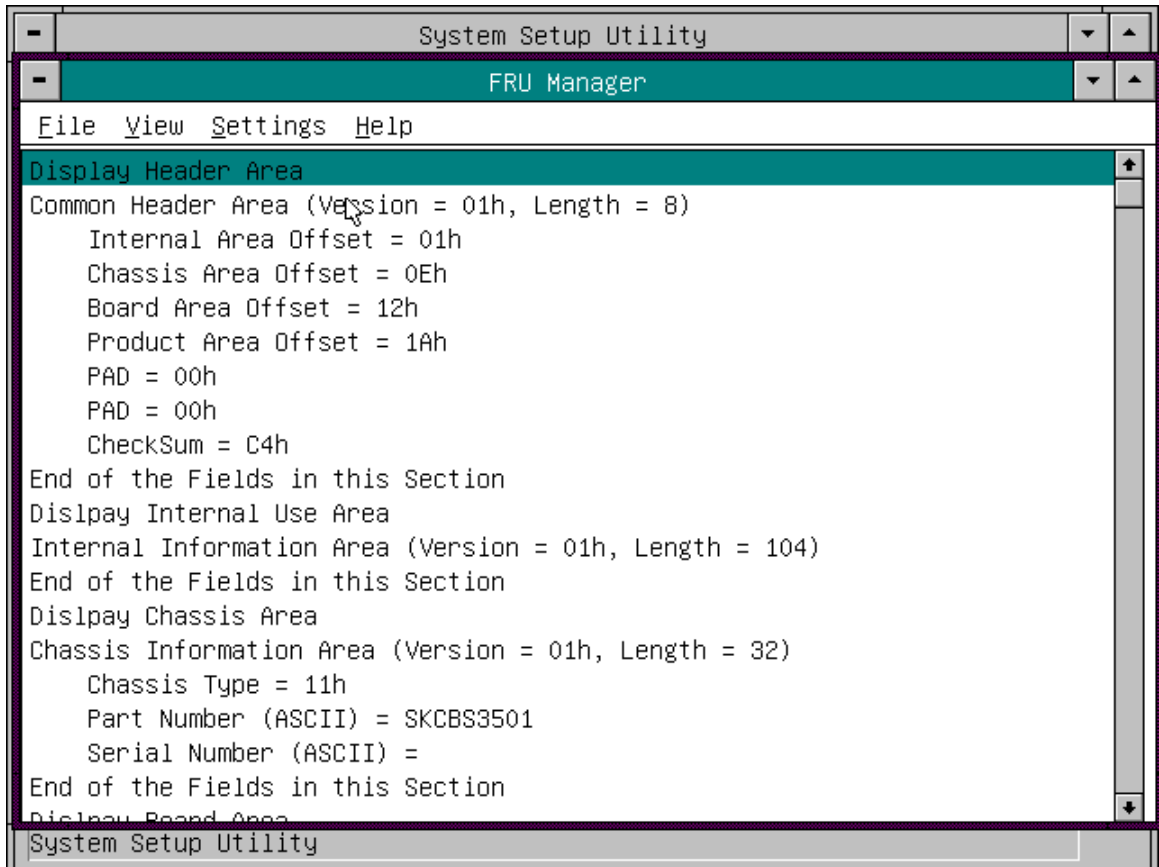


```
┌──────────────────────────────────────────────────────────────────────┐
│ ─         System Setup Utility                                   ▼  ▲  │
│ ┌──────────────────────────────────────────────────────────────────┐ │
│ │ ─                     FRU Manager                            ▼  ▲ │ │
│ ├──────────────────────────────────────────────────────────────────┤ │
│ │  File  View  Settings  Help                                       │ │
│ ├──────────────────────────────────────────────────────────────────┤ │
│ │ Display Header Area                                            ▲  │ │
│ │ Common Header Area (Version = 01h, Length = 8)                    │ │
│ │       Internal Area Offset = 01h                                  │ │
│ │       Chassis Area Offset = 0Eh                                   │ │
│ │       Board Area Offset = 12h                                     │ │
│ │       Product Area Offset = 1Ah                                   │ │
│ │       PAD = 00h                                                   │ │
│ │       PAD = 00h                                                   │ │
│ │       CheckSum = C4h                                              │ │
│ │ End of the Fields in this Section                                 │ │
│ │ Dislpay Internal Use Area                                         │ │
│ │ Internal Information Area (Version = 01h, Length = 104)           │ │
│ │ End of the Fields in this Section                                 │ │
│ │ Dislpay Chassis Area                                              │ │
│ │ Chassis Information Area (Version = 01h, Length = 32)             │ │
│ │       Chassis Type = 11h                                          │ │
│ │       Part Number (ASCII) = SKCBS3501                             │ │
│ │       Serial Number (ASCII) =                                     │ │
│ │ End of the Fields in this Section                                 │ │
│ │ Dislpay Board Area                                             ▼  │ │
│ ├──────────────────────────────────────────────────────────────────┤ │
│ │ System Setup Utility                                              │ │
│ └──────────────────────────────────────────────────────────────────┘ │
└──────────────────────────────────────────────────────────────────────┘
```

Figure 8. FRU Manager Main Window

Table 9.   FRU Manager Menus

Menu	Options
File	**Open FRU**: Opens FRU data from a previously saved file. **Save FRU**: Saves FRU data to a file in binary raw or verbose text format. **Exit**: Quits the FRU Manager.
View	**FRU Info**: Displays FRU information of the selected device. **All FRU Areas**: Displays FRU areas of all devices. **By Device Type**: Displays FRU areas sorted by device type.
Settings	**Display Hex**: Displays FRU areas in hex format. **Display Verbose**: Displays FRU areas in verbose format. **Output Text**: Saves FRU data in verbose format. **Output Binary**: Saves FRU data in binary format.
Help	**About**: Displays FRU Manager version information.

Configuration Software and Utilities

Exiting the SSU

Exiting the SSU causes all windows to close.

1. Exit the SSU by opening the menu bar item File in the SSU Main window.
2. Click <Exit>.
   Or
   Highlight Exit, and press <Enter>.

Direct Platform Control (DPC) Console

The DPC console provides an interface, called the console manager, to the EMP on the server. This interface allows remote server management via a modem or direct connection.

The following server control operations are available with the console manager:

- Connecting to remote servers.
- Powering the server on or off.
- Resetting the server.
- Switching the server console between EMP active and BIOS redirect modes.

The console manager uses three management plug-ins to monitor the server: the SEL, SDR, and FRU viewers. The console manager also has a support plug-in phonebook, which you can use to create and maintain a list of servers and their phone numbers. You can launch the Connect dialog directly from the Phonebook dialog to connect to a selected server.

How the DPC Console Works

The EMP shares the COM2 port with the system. When the EMP has control of the port, the port operates in command state. When the system has control of it, the port operates in redirect state. When connecting to a server, the DPC console checks to determine the current COM2 port state.

- **Command state**—the default COM2 state. In this state, the DPC console communicates with the server's firmware, allowing the client to remotely reset or power the server up or down. The client can also view the server's SEL, FRU information, or SDR table.
- **Redirect state**—the DPC console serves as a PC ANSI terminal window for BIOS console redirection. Commands typed in this window are transmitted through BIOS to the server's console, and text displayed on the server console is displayed on the DPC console's terminal window. With the EMP in this state, you can remotely view boot messages, access BIOS setup, and run DOS text mode applications through the DPC console's terminal window.
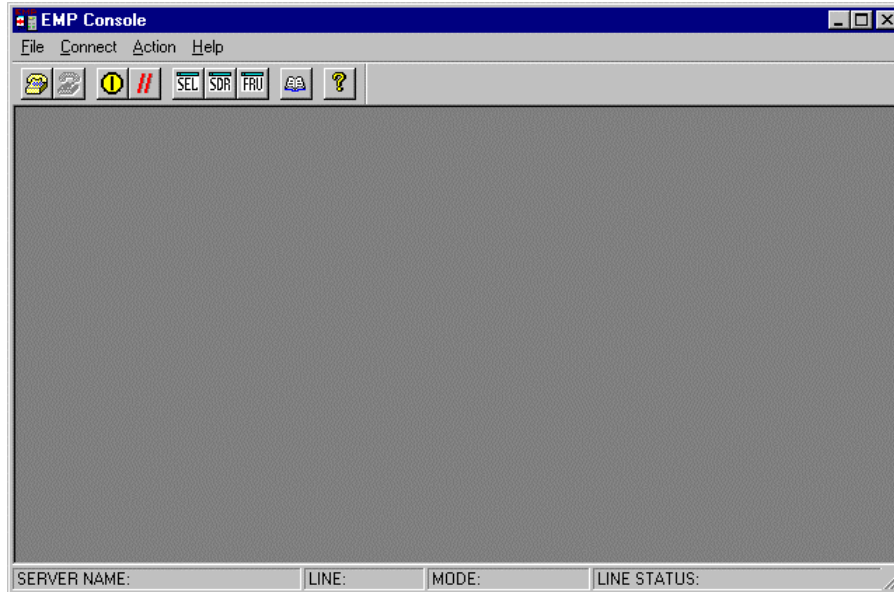
Figure 9. DPC Console in Command State
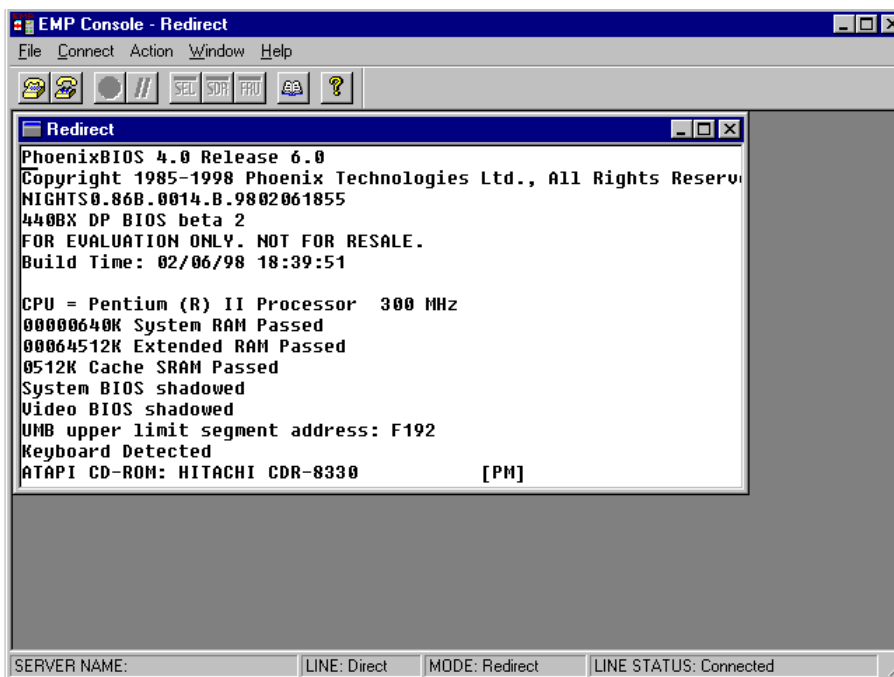
Figure 10. DPC Console in Redirect State

Figure 10 shows the DPC console window in redirect state with the terminal window. The text appearing on the server monitor displays in the redirect window.

Availability of DPC console features is determined by the following:

- The EMP access mode selected during configuration in the System Management Submenu of the BIOS Server Menu, and
- Whether the server's COM2 port is configured for console redirect in BIOS.

The three EMP access modes are disabled, preboot, and always active.

Table 10.   DPC Console Access Modes (server configured for console redirect)

Mode	Server is powered off	During POST	After OS boots
Disabled	Redirect window appears but is blank.	Redirect window.	Redirect window.
Preboot	EMP commands available.	Redirect window.*	Redirect window.
Always Active	EMP commands available.	Redirect window.*	EMP commands available.

*   You can modify the operation mode by selections in the POST reset and POST power-up dialogs. These are server control dialogs available with the DPC Console.

Table 11.   DPC Console Access Modes (server NOT configured for console redirect)

Mode	Server is powered off	During POST	After OS boots
Disabled	Redirect window appears but is blank.	Redirect window appears, but is blank.	Redirect window appears but is blank.
Preboot	EMP commands available.	EMP commands available.	Redirect window appears but is blank.
Always Active	EMP commands available.	EMP commands available.	EMP commands available.

DPC Console Requirements

This section outlines the requirements and configurations necessary for using the DPC console.

Operating Systems:

- Windows 98 or later
    — 16 MB of RAM, 32 MB recommended
    — 20 MB disk space
- Windows NT
    — Windows NT 4.0 or later
    — 24 MB of RAM, 32 MB recommended
    — 20 MB disk space

Client Configuration: The DPC console will support all COM ports on the client system, along with any Windows NT/95-compatible modem.

Server Configuration: The DPC console requires that the server's COM2 port be connected to an external modem or directly connected to a serial cable.

Direct Connect Configuration: A null modem serial cable is needed. Connect one end of the cable into the COM2 port of the server and the other into a port on the client machine.

Modem Configuration: On the client, the DPC console uses the Windows application program interface (API) to determine if a modem is connected and available. The DPC Console does not configure the modem; it should be preconfigured through Windows.

For modem support, the server must use a Hayes-compatible 14400 bps modem. The modem must be on the NT hardware compatibility list provided by Microsoft. The server modem must be set in autoanswer mode for the DPC console to be able to connect to it.

Setting Up the Server for the EMP

To use the EMP, you must configure BIOS with specific settings. Enter these settings into the BIOS Server Menu and the Console Redirection Submenu. These sections show ALL available options for BIOS settings.

The two sections on page 66, "Server Menu" and "Console Redirection Submenu," describe the settings that MUST be configured to use the EMP.

Server Menu

All EMP-related settings occur from the Server Menu. Change only the items below; all other default settings should remain the same.

EMP Password: Any time you attempt to initiate a connection, a prompt for the user password appears. If you never set up the EMP password, anyone can access the EMP by clicking <OK> through the password prompt.

In the EMP password area, type in a password of up to eight alphanumeric characters. If the system beeps, the password was not accepted; you must enter a different password.

EMP Access Modes: Choose either disabled, preboot, or always active, depending on the type of EMP access needed. Tables 10 and 11 (page 65) list what is available with a given setting.

EMP Restricted Mode Access: Set restricted mode to either enabled or disabled. In enabled mode, the DPC console's server control options, Power On/Off and Reset, are NOT available. In disabled mode, these options ARE available.

EMP Direct Connect/Modem Mode: Select Direct Connect if a null modem serial cable directly connects the server's COM2 port to the DPC console client machine. If they are connected via a modem, select Modem Mode.

Console Redirection Submenu

To use the EMP, you must set the following options exactly as noted.

COM Port Address: Select 2F8. This is the COM2 port that the EMP must use. The IRQ# setting is automatically assigned with the correct number based on the COM port address choice.

Baud Rate: Select 19.2K.

Console Type: Select PC ANSI.

Flow Control: Select CTS/RTS + CD.

Main DPC Console Window

The main DPC console window provides a graphical user interface (GUI) to access server control operations and to launch the management plug-ins. A menu and tool bar at the top of the GUI provide options to initiate plug-ins and other support features. A status bar at the bottom displays connection information like server name, line status, and mode.

Toolbar

The toolbar buttons combine server control and management plug-in options available from the Connect and Action Menus.

📞	Connects to a selected server.
☎	Disconnects from the currently connected server.
⏻	Powers the selected server on or off.
∥	Resets the selected server.
SEL	Opens the SEL viewer.
SDR	Opens the SDR viewer.
FRU	Opens the FRU viewer.
📖	Opens the phonebook.
❓	Opens online help.

Status Bar

The status bar displays at the bottom of the current window. It contains the following status information:

- **Server Name:** Lists the name of the connected server.
- **Line:** Lists the type of line connection—direct or modem.
- **Mode:** Lists mode—either redirect or EMP, depending on whether the EMP has control of the COM2 port.
- **Line Status:** Gives status information on the server connection. For example, if a server is connected, the status bar says "Connected." Otherwise, the line is blank.

DPC Console Main Menu

- **File**
  — **Exit:** Exits the DPC console.
- **Connect**
  — **Disconnect:** Disconnects the server connection.
  — **[Re]Connect:** Raises the connect dialog.
  — **(A list of the five most recent connections):** Initiates connection to selected server.

- **Action**
  - — **Power On/Off:** Powers the server on or off with post-power-up options.
  - — **Reset:** Resets the server with post-reset options.
  - — **FPC FRU Viewer:** Opens the FPC FRU viewer.
  - — **Phonebook:** Opens the phonebook dialog.
- **Help:** Provides version information and help topics for the DPC console.

Server Control Operations

Three server control operations are available from the menu or toolbar of the main DPC console window: Connecting to a remote server, powering the server on and off remotely, and resetting the server. The server console mode can also be switched between EMP active and BIOS redirect modes through post-power-up and post-reset options.

Connecting to Remote Server

Select [Re]Connect from the Connect Menu and follow the Connect dialog shown in Figure 11. Connect Dialog. This allows you to connect to a selected server. If the client machine is already connected to a server, initiating connection generates a warning message. The message states that the existing connection will be terminated if you continue trying to initiate the new connection. You are prompted to enter the EMP password whenever a connection is attempted.
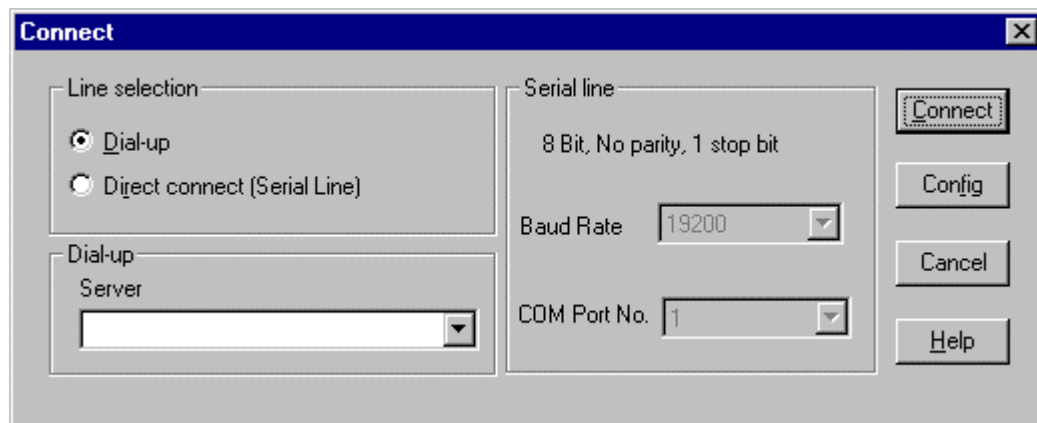
Figure 11. Connect Dialog

Options available in the dialog are:

- **Line Selection:**
  - — **Dial-up:** Connects to the selected server with a dial-up modem.
  - — **Direct connect (Serial Line):** Connects to the selected server directly using a null modem serial cable.
- **Server:** Displays a list of available servers in a dropdown edit list box. You can select or enter a server name; when the line selection is dial-up, you must select a server.

- **Serial Line:** When the line selection is set to direct connect (serial line), you must specify the following.
    — **Baud Rate:** Specifies baud rate; must be 19200 for DPC to connect properly.
    — **COM Port No.:** Sets the COM port number to which the null modem serial cable is connected.
- **Connect:** Initiates connection to the server. When you click this button, you are prompted for the EMP password.
- **Config:** Displays the Phonebook dialog.
- **Cancel:** Exit the Connect dialog with no action taken.
- **Help:** Display dialog-level help information.

Powering the Server On/Off Remotely

Select Power On/Off from the Action Menu to power the server on or off, with post-power-up options. This option generates the Power on/off dialog.
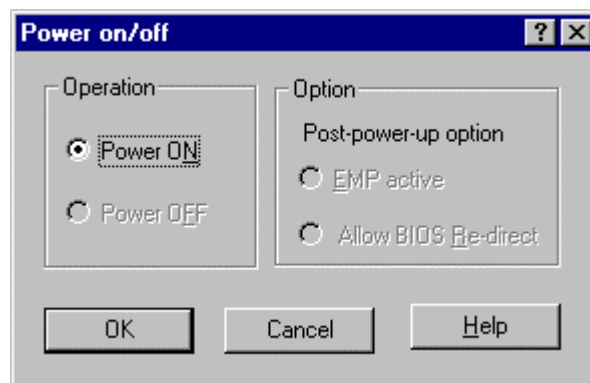
Figure 12. Power On/Off Dialog

Options available in the dialog are:

- **Power ON:** Powers on the server.
- **Power OFF:** Powers off the server. This option is not allowed if the server is configured in restricted mode for EMP operations.
- **Post-power-up option:** Sets the server mode to EMP active or BIOS redirection. The setting is effective at the next power-up. The default selection is EMP active.
- **Cancel:** Exits the dialog with no action taken.
- **Help:** Displays dialog-level help information.

Resetting the Server Remotely

Select Reset from the Action Menu to generate the Reset dialog so that you can remotely reset the server with post-reset options.
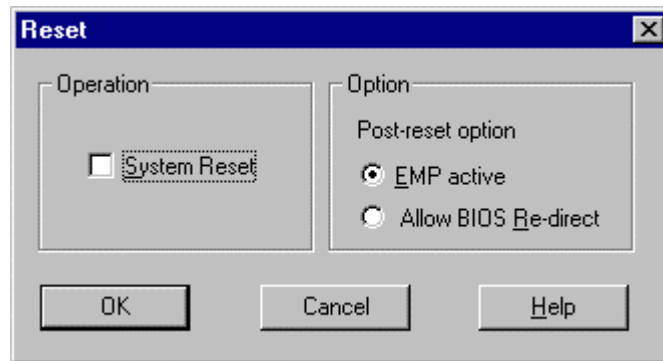
Figure 13. Reset Dialog

Options available in the dialog are:

- **System Reset:** Resets the server with the selected post-reset options. This operation is not allowed if the server is configured in restricted mode for EMP operations.
- **Option Group:** Sets the post-reset option that will be effective after reset. The options are EMP active or BIOS redirection. The default selection is EMP active.
- **Cancel:** Exits the dialog with no action taken.
- **Help:** Displays dialog-level help information.

Phonebook

The DPC console provides a phonebook, a support plug-in that stores names and numbers of servers in a list that can be updated by adding, modifying, or deleting entries. You can open the phonebook from the Main Menu and tool bars, or launch it by clicking the Config button.
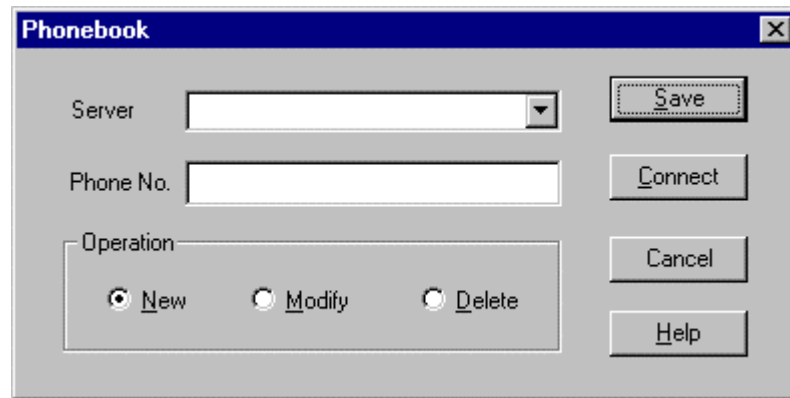
Figure 14. Phonebook Dialog

Options available in the dialog are:

- **Server:** Displays a dropdown list of server names previously stored in the phonebook. To clear the server field, select New.
- **Phone No.:** Displays the number of the selected server. To clear the Phone No. field, select New.
- **Operation:**
    — **New:** Makes a new entry in the phonebook. Selecting this option clears the Server and Phone No. fields. You must click <Save> to add the entry to the phonebook.
    — **Modify:** Edits an existing entry. First select an existing entry from the Server dropdown edit box and modify the existing phone number. Click <Save> to store this entry.
    — **Delete:** Deletes an entry from the phonebook. You must first select an existing server from the Server dropdown edit box. Click <Save> to delete the entry.
- **Save:** Saves a new or modified phonebook entry or deletes an entry if you have already selected the Delete radio button.
- **Connect:** Opens the Connect dialog with the server whose name appears in the phonebook's Server dropdown edit box.
- **Cancel:** Exits the dialog with no action taken.
- **Help:** Displays dialog-level help information.

Management Plug-Ins

Field Replaceable Unit (FRU) Viewer

The FRU viewer lets you view data from the server's FRU information area. Options available with the FRU viewer are:

- View all FRU records.
- View FRU summary information.
- Set FRU display mode to either hex or verbose mode.
- Close the FRU viewer.
- Exit the DPC console.

FRU Viewer Menu Options

The following menu options are on the FRU viewer menu bar:

- **File:**
  — **Close:** Closes the FRU viewer.
  — **Exit:** Exits the DPC console.
- **View:**
  — **Display all Records:** Displays all FRU data, which consist of chassis, board, and product information.
  — **FRU Info:** Displays the FRU summary information.
- **Settings:** Lets you change operating parameters for the FRU viewer. This menu displays the following suboption:
  — **Display Hex/Verbose:** Toggles between hex mode and interpreted mode of displaying FRU records.
- **Window:** Gives options for displaying currently open windows.
- **Help:** Provides version information for the FRU viewer and provides help topics on the DPC console.

FRU and SDR Load Utility

The Field Replacement Unit (FRU) and Sensor Data Record (SDR) load utility is a DOS-based program that updates the server management subsystem's product level FRU, SDR, and the Desktop Management Interface (DMI) nonvolatile storage components (EEPROMs). The utility:

- Discovers the product configuration based on instructions in a master configuration file.
- Displays the FRU information.
- Updates the EEPROM associated with the baseboard management controller (BMC) that holds the SDR and FRU area.
- Updates the DMI FRU area located in the BIOS nonvolatile storage device.
- Generically handles FRU devices that might not be associated with the BMC.

When to Run the FRUSDR Load Utility

You should run the FRUSDR load utility each time you upgrade or replace the hardware in your server, excluding add-in boards, hard drives, and RAM.

Because the utility must be reloaded to properly initialize the sensors after programming, turn the server off and remove the AC power cords from the server. Wait approximately 30 seconds, then reconnect the power cords and turn on the server.

What You Need to Do

You can run the utility directly from the configuration software CD-ROM or from diskettes you create from the CD-ROM.

If you choose to run the FRUSDR Load Utility from a diskette, you must copy the utility from the CD-ROM and follow the instructions in the included README.TXT file.

If your diskette drive is disabled, or improperly configured, you must use BIOS Setup to enable it. If necessary, you can disable the drive after you have finished using the FRUSDR utility.

How You Use the FRUSDR Load Utility

The utility:
- Is compatible with ROM-DOS Ver. 6.22, MS-DOS Ver. 6.22, and later versions.
- Accepts CFG, SDR, and FRU load files (the executable file for the utility is frusdr.exe).
- Requires the following supporting files:
    — One or more .fru files describing the system's FRUs
    — A .cfg file describing the system configuration
    — An .sdr file describing the sensors in the system

Command Line Format

The basic command line format is

```
frusdr [-?] [-h] [-d {dmi, fru, sdr}] [-cfg filename.cfg] [-fru filename.fru]
```

Table 12. Command Line Format

Command	Description
Frusdr	Is the name of the utility.
-? or –h	Displays usage information.
-d {dmi, fru, sdr}	Displays requested area only.
-cfg filename.cfg	Uses custom CFG file.
-p	Pause between blocks of data.

Parsing the Command Line

The FRUSDR load utility allows only one command line function at a time. A command line function can consist of two parameters. Example: -cfg filename.cfg. Invalid parameters generate an error message and cause the program to end. You can use either a slash (/) or a minus sign (-) to specify command line options. The -p flag can be used in conjunction with any of the other options.

Displaying Usage Information

When the utility is run with the -? or -h command line flags, the following message is displayed when the verbose flag -v is added to the help command:

```
FRU & SDR Load Utility Version 2.1 Revision R.1.1

 Usage:    Frusdr
           -? or –h           Displays usage information.
           -d {dmi,fru,sdr}   Only displays requested area.
           –cfg filename.cfg  Uses custom CFG file.
           –p                 Pause between blocks of data.
           –v                 Verbose, display any additional details.


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This utility must be run from a system executing DOS. Running in a Window's
DOS box is insufficient and will provide incorrect results. Programming the
BMC FRU area clears the SDR table; therefore the SDR table must be reprogrammed.
Upon completing the programming of the FRU and SDR areas, the server should be
rebooted.

Note: DOS users may alternatively use a '/' instead of the '-'.
```

The following information displays if the -v option is included in the command line.

```
The /D FRU command may be followed with up to 16 device addresses. These device
addresses are used to view up to 16 different FRU areas, instead of the default
of displaying the BMC FRU.  The arguments following the "-d FRU" are in the same
order and value as the NVS_TYPE, NVS_LUN, DEV_CONTROLLER, DEV_BUS and DEV_ADDRESS
which are found in the FRU file header in each FRU file. The LUN address and
device controller are optional.  If the LUN address is used, it must start with
an 'L'.  If the device controller is used, it must start with a 'C' and all other
parameters must be present.

        Usage:  FRUSDR –d fru (device) [devctrl] [lun] (bus) (addr) (addr2) (etc)
        Example:  FRUSDR /D FRU IMBDEVICE C22 L00 00 C0 C2
```

The configuration file can be used to load multiple FRU and SDR files. In the configuration file, you can define which FRU and SDR areas are to be programmed. Additionally, you can request information from the user or ask the user to choose which areas to program.

Displaying a Given Area

When the utility is run with the -d DMI, -d FRU, or **-d** SDR command line flag, the indicated area is displayed. Each area represents one sensor for each instrumented device in the server. If the given display function fails because of an inability to parse the data present or a hardware failure, the utility displays an error message and exits.

Displaying DMI Area

Each DMI area displayed is headed with the DMI area designated name. In each area, each field has a field name header followed by the field in ASCII or as a number.

Example:

To display the DMI area, type **frusdr -d dmi** and press <Enter>.

Displaying FRU Area

The FRU area is displayed in ASCII format when the field is ASCII or as a number when the field is a number. Each FRU area displayed is headed with the FRU area designated name. Each field has a field name header followed by the field in ASCII or as a number. The board, chassis, and product FRU areas end with an END OF FIELDS CODE that indicates there are no more data in the area. The internal use area is displayed in hex format, 16 bytes per line.

Example:

To display the FRU area, type **frusdr -d fru** and press <Enter>.

Displaying SDR Area

The SDR nonvolatile storage area is displayed in the following hex format. The data are separated by a sensor record number X header, where X is the number of that sensor record in the SDR area. The next line after the header is the sensor record data in hex format delineated by spaces. Each line holds up to 16 bytes. The data on each line are followed by the same data in ASCII format; nonprintable characters (ch < 32 || ch > 126) are substituted by a period (.).

Example:

To display the SDR area, type **frusdr -d sdr** and press <Enter>.

Using Specified CFG File

The utility can be run with the command line parameter of **-**cfg filename.cfg. The filename can be any DOS-accepted, eight-character filename string. The utility loads the specified CFG file and uses the entries in that file to probe the hardware and to select the proper SDRs to load into nonvolatile storage.

Displaying Utility Title and Version

The utility displays its title:

FRU & SDR Load Utility, Version X.X, Revision X.XX where X.XX is the revision number for the utility.

Configuration File

The configuration file is in ASCII text. The utility executes commands formed by the strings present in the configuration file. These commands cause the utility to run tasks needed to load the proper SDRs into the nonvolatile storage of the BMC and possibly generic FRU devices. Some of the commands may be interactive and require you to make a choice.

Prompting for Product Level FRU Information

Through the use of a configuration file, the utility might prompt you for FRU information.

Filtering Records From the SDR File

The MASTER.SDR file has all the possible SDRs for the system. These records will probably need to be filtered based on the current product configuration. The configuration file directs the filtering of the SDRs.

Updating the SDR Nonvolatile Storage Area

After the utility validates the header area of the supplied SDR file, it updates the SDR repository area. Before programming, the utility clears the SDR repository area. The utility filters all tagged SDRs depending on the product configuration set in the configuration file. Nontagged SDRs are automatically programmed. The utility also copies all written SDRs to the SDR.TMP file; it contains an image of what was loaded. The TMP file is also useful for debugging the server.

Updating FRU Nonvolatile Storage Area

After the configuration is determined, the utility updates the FRU nonvolatile storage area. First it verifies the common header area and checksum from the specified FRU file. The internal use area is read out of the specified .FRU file and is programmed into the nonvolatile storage. The chassis area is read out of the specified .FRU file. Finally, it reads the product area out of the specified FRU file, then the area is programmed into the FRU nonvolatile storage. All areas are also written to the FRU.TMP file.

Updating DMI FRU Nonvolatile Storage Area

After programming the BMC FRU area, the utility programs chassis, board, and product FRU information to the DMI fields, if the DMI flag follows each FRUAREA command in the configuration file.

Cleaning Up and Exiting

If an update was successfully performed, the utility displays a single message and then exits.

If the utility fails, it immediately exits with an error message and exit code.

Upgrading BIOS

Preparing for the Upgrade

Before you upgrade BIOS, record the current BIOS settings, obtain the upgrade utility, and make a copy of the current BIOS.

Recording the Current BIOS Settings

1. Boot the computer and press <F2> when you see the message:

   ```
   Press <F2> Key if you want to run SETUP
   ```

2. Write down the current settings in the BIOS Setup program.

⟹ **NOTE**

> Do not skip step 2. You will need these settings to configure your computer
> at the end of the procedure.

Obtaining the Upgrade Utility

You can upgrade to a new version of BIOS using the new BIOS files and the BIOS upgrade utility, iFLASH.EXE. You can obtain the BIOS upgrade file and the iFLASH.EXE utility through your computer supplier or from the Intel World Wide Web site:

http://www.intel.com

⟹ **NOTE**

> Review the instructions distributed with the upgrade utility before
> attempting a BIOS upgrade.

This upgrade utility lets you:

- Upgrade BIOS in flash memory
- Update the language section of BIOS

The following steps explain how to upgrade BIOS.

Creating a Bootable Diskette

1. Use a DOS or Windows 95 system to create the diskette.
2. Insert a diskette in drive A.
3. At the C:\ prompt, for an unformatted diskette, type:

   ```
   format a:/s
   ```

   or, for a formatted diskette, type:

   ```
   sys a:
   ```

4. Press <Enter>.

Creating the BIOS Upgrade Diskette

The BIOS upgrade file is a compressed self-extracting archive that contains the files you need to upgrade.

1. Copy the BIOS upgrade file to a temporary directory on your hard disk.
2. From the C:\ prompt, change to the temporary directory.
3. To extract the file, type the name of the BIOS upgrade file, for example:

   `10006BI1.EXE`
4. Press <Enter>. The extracted file contains the following files:

   LICENSE.TXT

   README.TXT

   BIOS.EXE
5. Read the LICENSE.TXT file, which contains the software license agreement, and the README.TXT file, which contains the instructions for the BIOS upgrade.
6. Insert the bootable diskette into drive A.
7. To extract the BIOS.EXE file to the diskette, change to the temporary directory that holds the BIOS.EXE file and type:

   `BIOS A:`
8. Press <Enter>.
9. The diskette now holds the BIOS upgrade and recovery files.

Upgrading BIOS

1. Boot the computer with the diskette in drive A. The BIOS upgrade utility screen appears.
2. Select Update Flash Memory From a File.
3. Select Update System BIOS. Press <Enter>.
4. Use the arrow keys to select the correct .bio file. Press <Enter>.
5. When asked toconfirm that you want to flash the new BIOS into memory, select Continue with Programming. Press <Enter>.
6. When the utility displays the message that the upgrade is complete, remove the diskette. Press <Enter>.
7. As the computer boots after the upgrade, check the BIOS identifier (version number) to make sure the upgrade was successful.
8. To enter the Setup program, press <F2> when you see the message:

   `Press <F2> Key if you want to run SETUP`
9. For proper operation, load the Setup program defaults. To load the defaults, press <F9>.
10. To accept the defaults, press <Enter>.
11. Set the options in the Setup program to the settings you wrote down before the BIOS upgrade.
12. To save the settings, press <F10>.
13. To accept the settings, press <Enter>.
14. Turn off the computer and reboot.

Recovering BIOS

It is unlikely that anything will interrupt the BIOS upgrade; however, if an interruption occurs, BIOS could be damaged. In that case, you must recover BIOS.

⟹ **NOTE**

> Because of the small amount of code available in the nonerasable boot block area, there is no video support. You will not see anything on the screen during the procedure. Monitor the procedure by listening to the speaker and looking at the diskette drive LED.

The procedure for recovering BIOS is detailed in "Recovery Boot Switch" on page 184. After doing the procedure, leave the upgrade disk in drive A and turn on the server, then continue with the BIOS upgrade (see page 78).

Changing BIOS Language

You can use the BIOS upgrade utility to change the language that BIOS displays. Use a bootable diskette containing the Intel flash utility and language files (see page 78).

1. Boot the computer with the bootable diskette in drive A. The BIOS upgrade utility screen appears.
2. Select Update Flash Memory from a file.
3. Select Update Language Set. Press <Enter>.
4. Select drive A and use the arrow keys to select the correct .lng file. Press <Enter>.
5. When asked toconfirm that you want to flash the new language into memory, select Continue with Programming. Press <Enter>.
6. When the utility displays the message that the upgrade is complete, remove the diskette. Press <Enter>.
7. The computer will reboot and the changes will take effect.

Using the Firmware Update Utility

The Firmware Update Utility is a DOS-based program that updates the BMC's firmware code. You need to run the utility only if new firmware code is necessary.

Running the Firmware Update Utility

1. Create a DOS-bootable diskette. The version of DOS must be 6.0 or higher.
2. Place the firmware update utility (FWUPDATE.EXE) and the *.hex file on the diskette. Make a note of the *.hex file name, because you will need it later.
3. Insert the diskette into the drive and boot to it.
4. At the DOS prompt, run the executable file (FWUPDATE.EXE).
5. The utility will display a menu screen. Select Upload Flash.
6. The utility will ask for a file name. Enter the name of the *.hex file.
7. The program will load the file and then ask if it should upload boot block. Read the release notes accompanying your system to verify that a boot block upgrade is not needed. If it is not, press "N" to continue.
8. The program will next ask if it should upload operational code. Press "Y" to continue.
9. Once the operational code has been updated and verified, press any key to continue. Then press <ESC> to exit the program.
10. Shut the system down and remove any diskettes in the system.
11. Disconnect all AC power cords from the system and wait 60 seconds.
12. Reconnect the AC power cords and power up the system.

Installing Video Drivers

After configuring the system, you need to install video drivers to take full advantage of the features of the onboard ATI Rage XL SVGA video controller.

- The configuration software CD-ROM includes video drivers for use with DOS and Windows NT. Check the README.TXT file on the CD-ROM for information on installing these drivers.
- For other operating systems, see your OS instructions for installing device drivers.

Using the QLogic SCSI Utility

The QLogic SCSI utility detects the SCSI host adapters on the system board. Use the utility to:

- Change default values.
- Check and/or change SCSI device settings that may conflict with those of other devices in the server.

Running the SCSI Utility

When this message appears on the video monitor:

```
Press Ctrl-C to start QLogic Configuration Utility...
```

Press <Alt+Q> to run the utility. When it appears, choose the host adapter that you want to configure.

4 Hot-Swapping Fans, SCSI Hard Drives, and Power Supplies

Tools and Supplies Needed

- Phillips (cross-head) screwdriver (#2 bit)
- Antistatic wrist strap (recommended)
- Pen or pencil

Equipment Log

To record the model and serial numbers of the server, all installed options, and any other pertinent information about the server, see Appendix B, "Equipment Log and Configuration Worksheets" on page 197. You will need this information when running the SSU.

Hot-Swapping Fans

When the yellow fan failure LED on the front panel turns on, you can determine which fan is defective by checking each yellow fan failure LED mounted next to each fan. When a fan fails, the LED on the front panel will be on continuously. You must hot-swap the failed fan—remove and replace it—with a good one. You DO NOT need to shut down the server to hot-swap a failed fan.

⚠ **CAUTION**

> Even though the server can continue operating with only five fans, the defective fan must be replaced in a reasonable amount of time.

Removing a Fan

See Figure 15

1. Remove the screw (A) that secures the fan array cover (B).
2. Slide the fan array cover to the server front to free it from the locking tabs. Lift the cover.
3. Look at the yellow fan failure LEDs to determine which fan is defective.
4. Insert your thumb and forefinger into the grasp holes (B in Figure 15) of the failed fan.
5. Pull the fan straight up, out of the housing. Set it aside.

Replacing a Fan

See Figure 15

1. Remove the new fan from its protective packaging.
2. Record the model and serial numbers of the fan in your equipment log (page 197).

⇒ **NOTE**

> Fans are keyed and can be inserted in only one way. Be sure that the fan connector mates with the front panel connector when aligning the fan in the fan cavity.

3. Align the fan with the fan cavity.
4. Push straight down on the fan until it is fully seated in the cavity.
5. Replace the fan array cover with its securing screw.
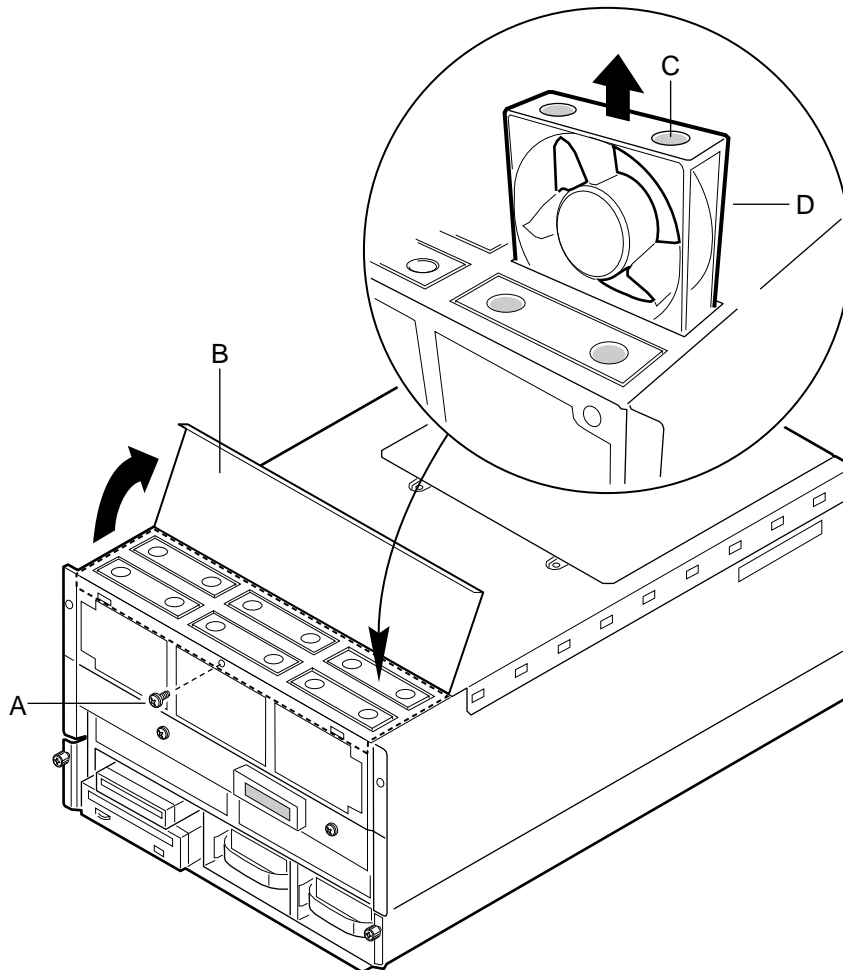
OM10702

Figure 15. Removing/Hot-swapping a Fan

A. Fan cover screw
B. Fan cover
C. Grasp holes
D. Fan

Hot-Swapping a SCSI Hard Drive

Hot-Swapping Bays

Two 3.5-inch hot-swapping bays provide space for 3.5 inches X 1 inches (or 1.6 inches) single connector attachment (SCA2) SCSI hard disk drives. You can install up to two industry-standard wide/ultra or wide/ultra2 SCA-type hard disk drives in these bays.

The power supply fans provide cooling for the hot swap drives. A system with two power supplies is capable of cooling most drives that would be installed into the system. However, drives that dissipate a large amount of power might require three power supplies to ensure proper cooling. See the product specifications to determine if the particular drive to be installed needs the additional cooling provided by a third power supply.

Carriers for 3.5-inch wide 1-inch or 1.6-inch height drives allow easy hot-swapping of drives in and out of these bays without shutting down the server.

You can easily set up RAID[†] applications if you install a Redundant Array of Inexpensive Disks (RAID) controller board on the PHP I/O carrier, RAID software, and SCSI hard disk drives in the hot-swapping bays.

SCSI SCA Hard Disk Drives

The server supports a variety of single-ended SCSI SCA-type hard disk drives. As shipped from the supplier, the server might not contain any drives. Contact your sales representative or dealer for a list of approved drives that can be installed in the server.

Mounting a SCSI SCA Hard Disk Drive in a Carrier

See Figure 16 and Figure 17 (page 85).

1. Remove the 3.5-inch hard disk drive from the protective wrapper, and place it on an antistatic surface.
2. Record the model and serial numbers of the drive in your equipment log.
3. Orient the drive carrier so that the handle is toward your left and the metal EMI/ESD fingers are toward your right.
4. Orient the drive so that:
   - The drive's label faces away from the carrier heatsink, toward the carrier fingers
   - The drive's connector faces away from the carrier handle

⚠ CAUTION

Be careful not to bend or damage the carrier's metal fingers as you attach the drive to the carrier.

5. Position the drive in the end of the carrier away from the handle, then slide the drive toward the handle.

6. Place the drive and carrier assembly on an antistatic surface of a table or a workbench so that the drive handle and fingers overlap the edge of the table or the workbench (see Figure 17).

7. Using four screws of the appropriate size and length (not supplied), attach the carrier to the drive.

⚠ CAUTION

Some specific hard disk drive designs require electrical isolation of the drive from the chassis or other ground paths. These drives are usually clearly labeled with this requirement on the drive. Full-height, 1.6-inch drives with this requirement must have an electrical isolator like durable mylar tape placed between the EMI/ESD grounding fingers and the top cover of the drive. Failure to isolate this type of drive from the ground path will result in unpredictable operation of the drive, including severely impacted performance and data corruption.

OM07153

OM08268
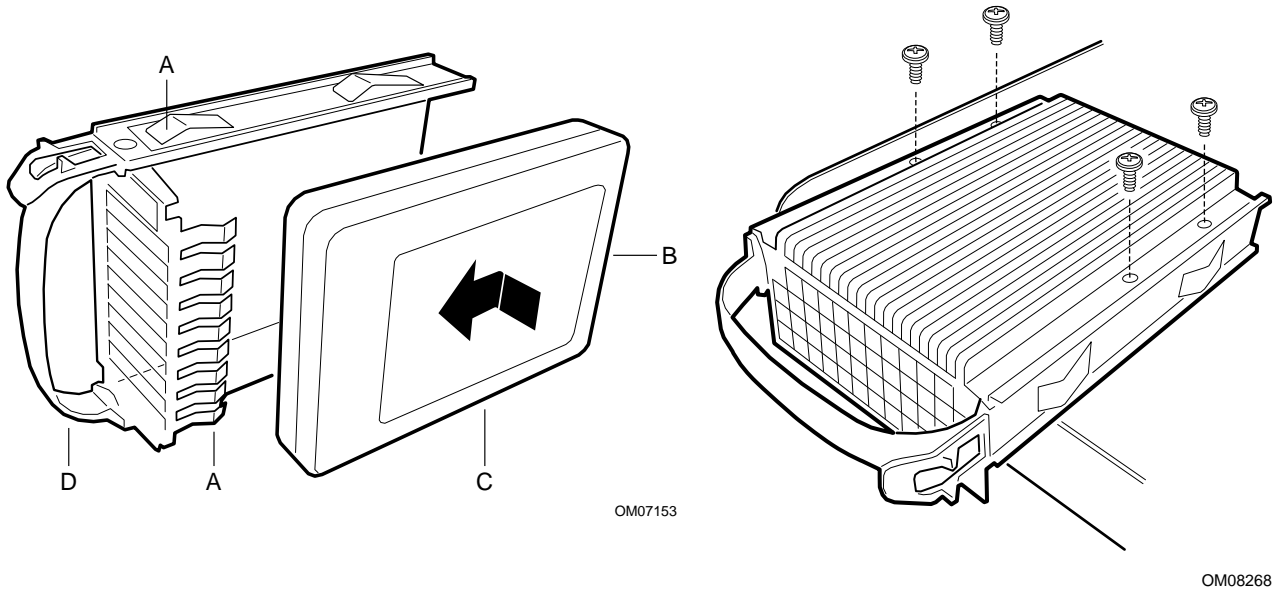
Figure 16. Hard Disk Drive and Carrier

A. EMI/ESD grounding clips and fingers
B. SCA connector
C. SCSI hard disk drive
D. Drive carrier handle

Figure 17. Mounting Hard Disk Drive to Carrier Assembly

Installing a SCSI SCA Hard Disk Drive in a Hot-Swapping Bay

See Figure 18.

1. Orient the carrier and drive assembly in front of the hot-swapping bay guide rails so that metal fingers of the perforated metal bracket attached to the carrier are facing up. Make sure that the carrier is placed correctly into the guide rails to avoid damage.
2. While grasping only the drive carrier handle, firmly push the assembly into the bay until the drive docks with the hot-swapping backplane connector.

⚠ CAUTION

Do not press on the perforated metal bracket of the carrier when you push the assembly into the bay, or you can damage the metal fingers of the bracket.
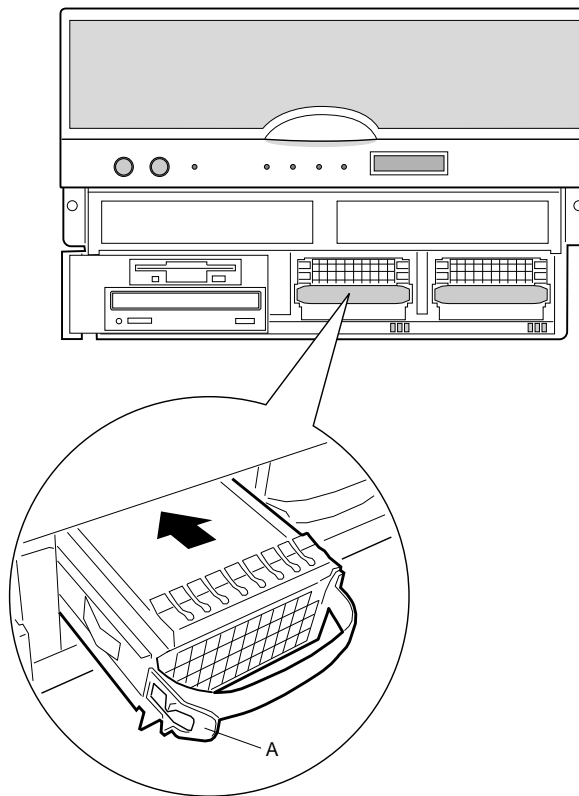
OM07527

Figure 18. Installing a Hard Disk Drive

A.   Drive carrier latch

3. If you installed a RAID controller board, run the Disk Array Controller Configuration utility supplied with the board. See the manufacture's documentation provided.

Determining Drive Status

Status LEDs arranged in sets of three below each of the two hot-swapping bays monitor the status of each drive. When a yellow LED is on continuously, it is okay to hot-swap (remove and replace) a bad drive with a good one. You DO NOT need to shut down the server to hot-swap a drive.

Table 13. SCSI Drive Status LED Descriptions

SCSI drive present, power on Green LED, A	SCSI drive active Green LED, B	SCSI drive faulty* Yellow LED, C	Description and action if needed
● ▬ On	○ ▬ Off	○ ▬ Off	Drive is present with power.
● ▬ On	● ▬ Blinking	○ ▬ Off	Drive is present with power and is being accessed.
○ ▬ Off	○ ▬ Off	● ▬ On	Drive CAN be replaced. Steady yellow fault light indicates drive has a problem. Power to drive is off.
● ▬ On	○ ▬ Off	● ▬ Slow blinking	Drive SHOULD NOT be replaced at this time. A slowly blinking yellow fault light indicates that a drive that has just been replaced is in recovery mode (drive array being rebuilt). Power to drive is on.
○ ▬ Off	○ ▬ Off	○ ▬ Off	There is no drive installed in the bay.

* The hot-swap controller is responsible for turning the yellow drive fault LED on or off according to the states specified by commands received via SAF-TE and IMB.

1. Look at the yellow LEDs below the hot-swapping bays to determine which drive is bad.
2. Push on the drive carrier latch of the bad drive, and while grasping the handle, pull the assembly toward you to disengage the drive from the backplane connector.
3. Before moving the drive any further, wait 30 seconds. This elapsed time allows the drive platter to stop rotating.
4. Carefully slide the assembly out of the bay, and place it on an antistatic surface.
5. Orient the new carrier and drive assembly in front of the hot-swapping bay guide rails so that the metal fingers of the perforated metal bracket attached to the carrier are facing up. Make sure you correctly place the carrier into the guide rails to avoid damage.
6. While grasping only the drive carrier handle, firmly push the assembly into the bay until the driver carrier latches.

⚠ CAUTION

Do not press on the perforated metal bracket of the carrier when you push the assembly into the bay. Otherwise you may damage the metal fingers of the bracket.

Hot-Swapping Power Supplies

⇒ **NOTE**

> You must have three power supplies installed to hot-swap a supply. If you
> have only two supplies installed, they must occupy the left and center bays
> (as you face the back of the server — see Figure 19 on page 89).

When the yellow power supply failure LED on the front panel turns on, you can determine which power supply is defective by checking the three status LEDs on the back of each supply. If a power supply fails, the yellow FAIL LED on the back of the power supply will be on continuously. You must hot-swap the power supply—remove and replace it—with a good one. If the server contains three power supplies, you DO NOT need to shut down the server to hot-swap a failed power supply.

- **Green PWR (Power) LED**—when blinking, AC is applied to the power supply and standby voltages are available. When on continuously, all power outputs are ready.
- **Yellow FAIL(Power Supply Failure) LED**—when on continuously, the power supply has failed and it must be replaced.
- **Yellow PR_FL (Predictive Failure) LED**—when blinking, the power supply is about to fail in the near future because the fan is performing poorly.

Power Supply Status	Power Supply LEDs		
	PWR (power) (Green)	FAIL (power supply failure) (Yellow)	PR_FL (predictive failure) (Yellow)
No AC power	Off	Off	Off
AC in/standby outputs on	Blinking	Off	Off
DC outputs on and okay	On	Off	Off
Power supply failure	Off	On	Off
Current limit	On	Blinking/None Latch	Off
Predictive failure	On	Off	Blinking/Latched

Hot-Swapping a Power Supply

In a fully configured server, the power system contains three 750 watt autoranging power supplies; the third one is redundant. If a single power supply fails in the redundant power system, the yellow power supply failure LED on the front panel turns on. You can easily hot-swap the defective power supply without turning the server power off.

Power supplies are hot-swappable only in configurations with three power supplies.

⚠ **WARNING**

> **Because of chassis airflow disruption, the power supply bay should not
> be vacant for more than five minutes when server power is on.
> Exceeding the five-minute limit may cause damage to certain peripheral
> components.
> Before replacing a power supply in a two-power supply configuration,
> you must turn off power to the server.**

Removing a Power Supply

⚠ **CAUTIONS**

Turn off peripheral devices: If the chassis contains only two power supplies, turn off all peripheral devices connected to the server. Then turn off the server power with the push-button on/off switch on the front panel.

Populate all bays: Figure 19 shows the far-right power supply bay vacant. To ensure correct airflow, you must populate this bay with a redundant power supply or cover panel. The figure is intended to show a power supply bay with the supply removed and not yet replaced, not an acceptable configuration for a system during operation.

See Figure 19.

1. Look at the yellow FAIL LEDs on the power supplies to determine which one is defective.
2. Pull the power supply handle down to unlock it from the chassis.
3. Pull the power supply straight back, out of the chassis. Set it aside.

OM07324
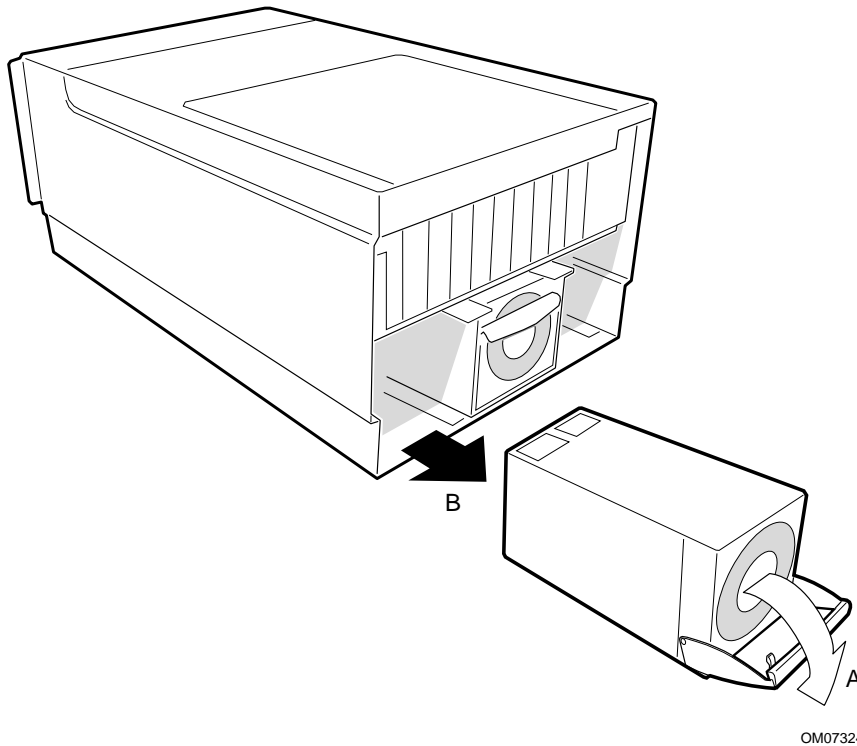
Figure 19. Removing a Power Supply

A. Pull down handle first
B. Slide power supply out

Replacing a Power Supply

See Figure 19.

1. Remove the new power supply from the protective packaging, and place it on an antistatic surface.
2. Record the model and serial numbers of the power supply in your equipment log (page 197).
3. Slide the replacement power supply into the power supply cavity.
4. Lift the power supply handle to lock it into place.

Part II: Service Technician's Guide

5   Working Inside the System

6   Upgrading Boardset Components

7   Solving Problems

8   Technical Reference

A   Power System: Description/Calculating Power Usage

B   Equipment Log and Configuration Worksheets

C   Regulatory Specifications

D   Warnings

⚠ **WARNING**

> **Only a QUALIFIED SERVICE TECHNICIAN is authorized to remove the server covers and to access any of the components inside the server. Before removing the covers, see "Safety: Before You Remove Server Covers" on page 93 and " Warnings and Cautions" on page 94.**

This manual is divided into two parts:

- *User's Guide*, beginning on page 11—describes procedures that DO NOT REQUIRE internal server access. You do not need to be a qualified service technician to perform procedures listed in the *User's Guide*.
- *Service Technician's Guide*, beginning on page 91—describes procedures that REQUIRE internal server access. You must be a qualified service technician to perform procedures listed in the *Service Technician's Guide*.

5 Working Inside the System

This chapter describes procedures for removing and installing most components inside the system. Table 14 lists these procedures and their page numbers in this chapter.

Table 14.   Procedures in Chapter 5

Item	Page	Item	Page
• Front bezels	95	• I/O tray	113
• Server covers	95	• ICMB board	116
• Fan array housing	101	• AC filter and cable	117
• LCD module	102	• Peripheral bay	117
• Profusion carrier tray	104	• Peripheral bay backplane	119
• Front panel controller board	106	• Peripheral bay blind mate board	121
• Add-in boards	108	• Diskette drive	124
• I/O riser board	111	• Peripheral drives	126
• PHP LED Board	113		

Tools and Supplies Needed

- Phillips (cross-head) screwdriver (#1 and #2 bit).
- Small flat-bladed screwdriver.
- Jumper removal tool or needle-nosed pliers.
- Antistatic wrist strap and conductive foam pad (recommended).
- Pen or pencil.
- Equipment log: as you integrate new parts into the system, add information about them to your equipment log (page 197). Record the model and serial number of the system, all installed options, and any other pertinent information specific to the system. You will need this information when running the SSU.

Safety: Before You Remove Server Covers

Before removing covers at any time to work inside the system, observe these safety guidelines.

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by using the push-button on/off power switch on the front of the system.
3. Unplug the AC power cords from the system or wall outlet.
4. Label and disconnect all peripheral cables and all telecommunication lines connected to I/O connectors or ports on the back of the system.
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.

Warnings and Cautions

These warnings and cautions apply whenever you remove covers of the system. Only a technically qualified person should integrate and configure the system.

⚠️ **WARNINGS**

System power on/off: **The on/off button (a convex button) on the front panel DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cords from the wall outlet or the system.**

Hazardous conditions, power supply: **Hazardous voltage, current, and energy levels are present inside the power supply. There are no user-serviceable parts inside it; servicing should be done by technically qualified personnel.**

Hazardous conditions, devices, and cables: **Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect the power cords, telecommunications systems, networks, and modems attached to the system before opening it. Otherwise, personal injury or equipment damage can result.**

⚠️ **CAUTIONS**

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you do all procedures in this chapter only at an ESD-protected workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place it component-side UP on a grounded, static-free surface. If you place the I/O carrier on a conductive surface, the battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Use a conductive foam pad if available but NOT the board wrapper. Do not slide board over any surface.

Cooling and airflow: For proper cooling and airflow, always install the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts.

Removing and Installing the Front Bezels

See Figure 20.

1. Use the finger grips to pull the bezels away from the chassis.
2. Remove the bottom bezel to access the hot-swap drives and the peripheral bay.
3. Remove the top bezel to access the following:

    - Front side of the fan bay.

    - Front panel controller switches (power, reset, and nonmaskable interrupt (NMI) and indicator lights (power indicator, predictive power supply failure, predictive fan failure, and hard drive failure).

4. Reinstall the bottom bezel by aligning the clips with the ball studs on the chassis and pushing the bezel onto the chassis.
5. Reinstall the top bezel by aligning the ball studs with the clips on the chassis and pushing the bezel onto the chassis.
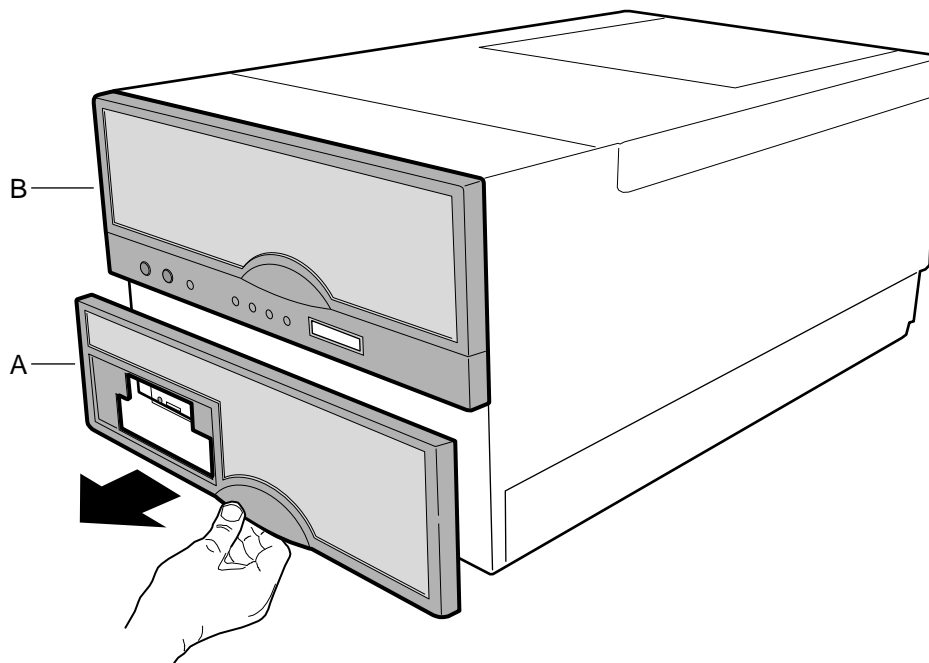
OM10705

Figure 20. Removing the Front Bezels

A. Bottom Bezel
B. Top Bezel

Removing and Installing Server Covers

See Figure 21. The server comes with several removable covers:

- The fan array cover provides access to the 6-fan array.
- The PCI bus hot-plug cover provides assess to the PCI bus hot-plug slots.
- The top cover provides access to the profusion carrier, I/O carrier, and 240 VA protective cover. You must remove the top cover before you can remove the 240 VA protective cover.
- The memory module cover provides access to the two memory modules.

⚠ CAUTION

For proper cooling and airflow, do not operate the server with the covers removed. Always reinstall them before turning on the server.
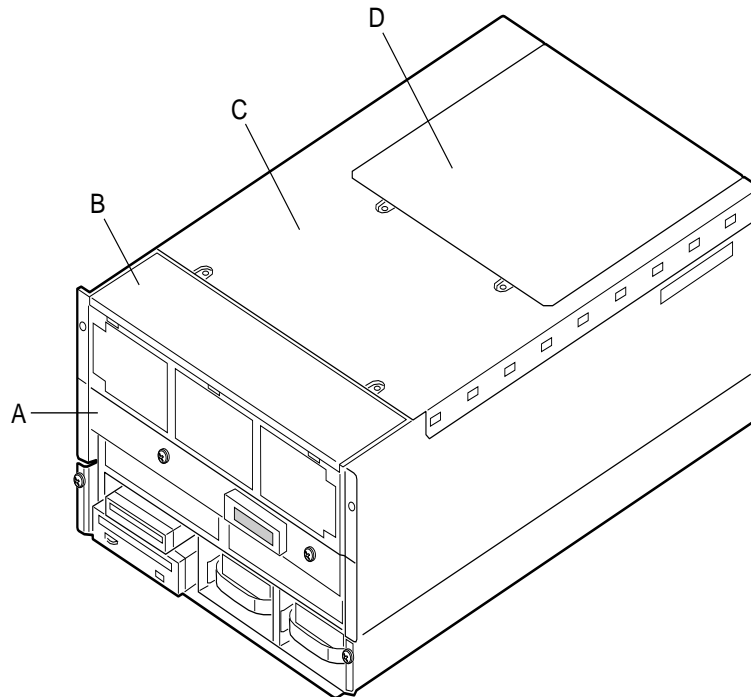
OM07514

Figure 21. Server Covers

A.   Memory module cover
B.   Fan array cover
C.   Top cover
D.   PCI hot-plug cover

Removing the PCI Bus Hot-Plug Cover

See Figure 22.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove and save the screws that attach the PCI bus hot-plug cover to the chassis.
3. While facing the front of the server, push the PCI cover toward the back of the server to disengage the tabs from the top cover.
4. Remove the cover and set it aside.
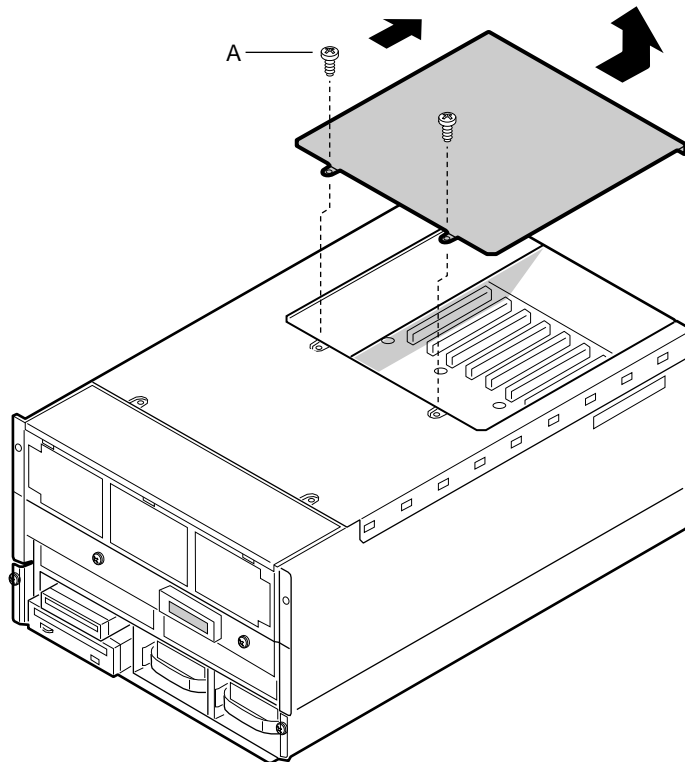
OM10750

Figure 22. Removing the PCI Bus Hot-Plug Cover

A. Screws (2)

Installing the PCI Bus Hot-Plug Cover

1. Ensure that add-in boards are firmly seated in their respective slots and that the retaining brackets for the add-in boards are reinstalled.
2. Position the hot-plug cover over the top cover so that the tabs along its edges align with the slots in the top cover.
3. Lower the hot-plug cover until it rests on the top cover.
4. Push the hot-plug cover toward the front of the server to engage the row of tabs attaching the hot-plug cover to the top cover.
5. Attach the hot-plug cover to the top cover using the screws you removed earlier.

Removing the Top Cover

See Figure 23 (page 98) and Figure 24 (page 99).

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Turn off all peripheral devices connected to the server.
3. Turn the server off with the push-button on/off power switch on the front panel.
4. Unplug the AC power cord from the power inlet receptacle, or from the power source outlet.
5. Label and disconnect all peripheral cables attached to the I/O panel on the back of the server.
6. Remove and save the screws that attach the top cover to the chassis.

⇒ **NOTE**

   It is not necessary to remove the PCI bus hot-plug cover.

7. While facing the front of the server, push the top cover toward the back of the chassis to disengage the row of tabs attaching the cover to the chassis.
8. Push the cover back about an inch, then lift it straight up. Set the cover aside.
9. Lift the 240 VA protective cover from the chassis (see Figure 24 on page 99).
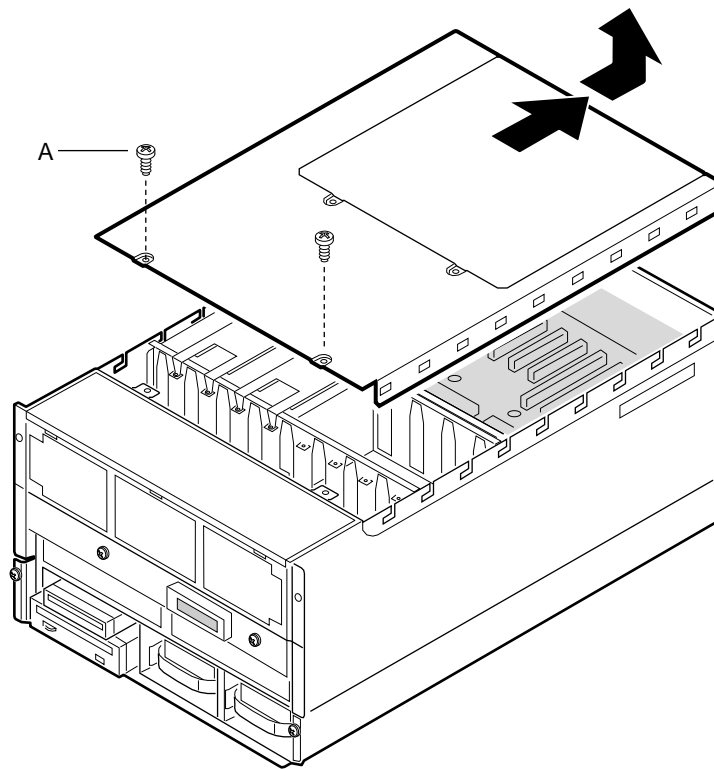
OM11017

Figure 23. Removing the Top Cover

A. Two screws
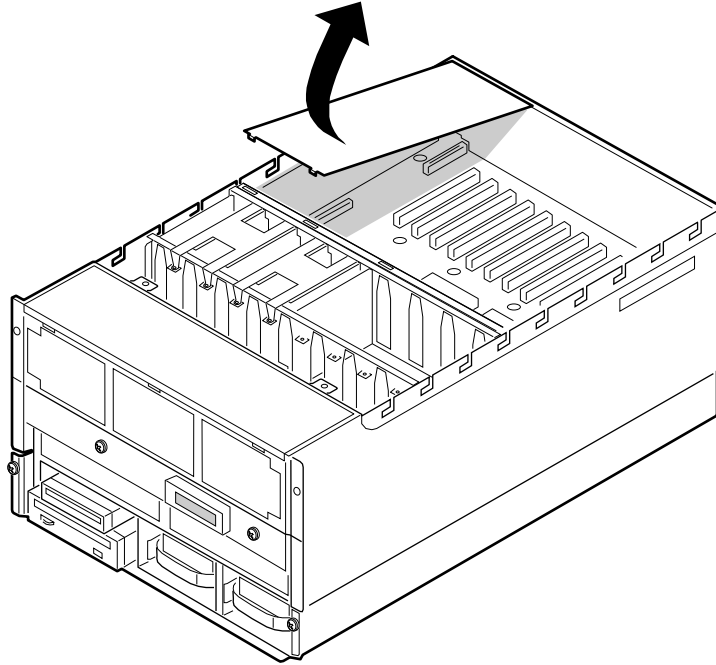
OM11029

Figure 24. Removing the 240 VA Protective Cover

Installing the Top Cover

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Install the 240 VA protective cover.
3. While facing the back of the server, position the top cover over the chassis so that the tabs along the edges of the cover align with the slots in the top edge of the chassis.
4. Gently lower the cover straight down on top of the server.
5. Place your hands on opposite sides of the cover, then push the cover forward to seat it.
6. Attach the cover to the chassis with the screws you removed earlier, and tighten them firmly (6.0 inch-pounds).
7. Connect all external cables and power cords to the server.

Removing the Memory Module Cover

See Figure 25.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the four screws securing the memory module cover and remove the cover.
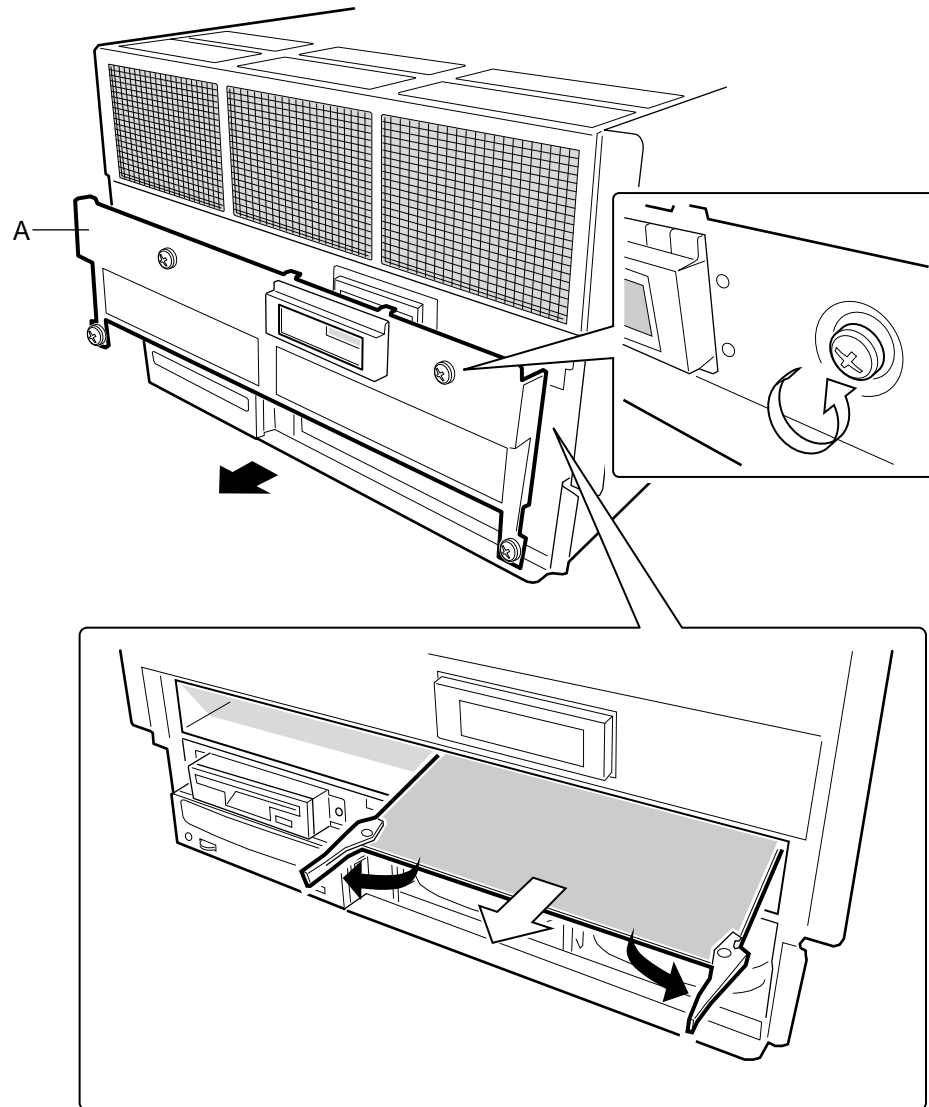
OM10703

Figure 25. Removing the Memory Module Cover and Memory Module

A.   Memory module cover

Installing the Memory Module Cover

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Place the cover in position.
3. Attach the cover to the chassis with the screws you removed earlier.

Fan Array Housing

Removing the Fan Array Housing

See Figure 26 (page 102).

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the following:
    - Top cover (see "Removing the Top Cover" on page 98).
    - Fan array assembly cover and all fans (see "Hot Swapping Fans" on page 82).
    - Memory module cover (see "Removing the Memory Module Cover" on page 100).
3. Remove and save the three screws that secure the fan housing to the chassis.
4. Use the frame of the housing (the space the individual fans occupied) as a handle to remove the housing:
    - Tip the fan assembly forward.
    - Slide the alignment pins free from the front edge of the profusion carrier.
    - Pull the housing straight up, away from the chassis, then set it aside.

Installing the Fan Array Housing

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Reinstall the fan array housing ensuring that it engages with the support tabs (A in Figure 26).

⟹ **NOTE**

> When installing the fan array housing, be careful not to accidentally move the thin sheet of insulating material on the front panel board. Proper insertion of the LED light pipes depends on the correct alignment of the insulating material.

3. Insert the screws that you removed earlier and tighten the screws firmly (8.0 inch-pounds).
4. Reinstall each fan assembly. The fan assemblies are keyed and can be installed in only one way.
5. Reinstall the top cover, the fan array assembly cover, and the memory module cover.
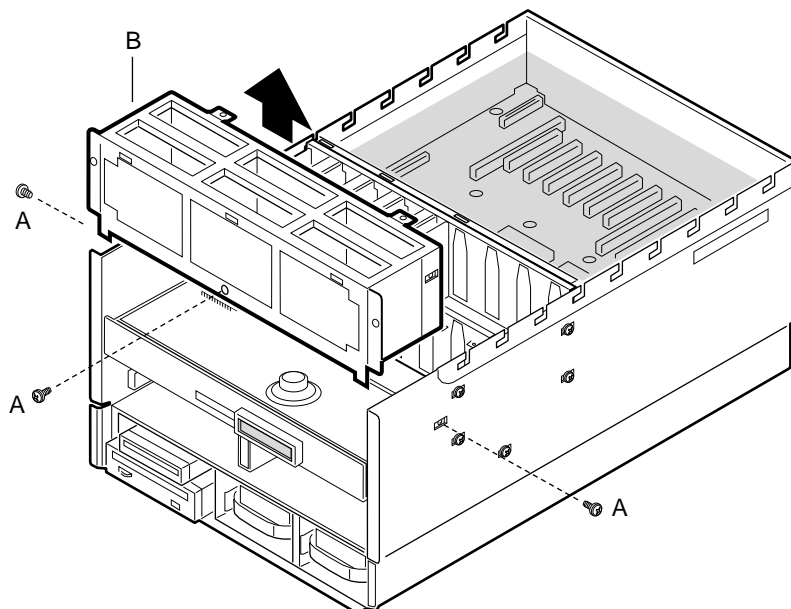
OM10692

Figure 26. Removing the Fan Housing

A. Screws (three)
B. Fan housing

LCD Module

The LCD module displays server information.

Removing the LCD Module

See Figure 27.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the memory module cover (see "Removing the Memory Module Cover" on page 100).
3. Remove the fan array housing (see "Removing the Fan Array Housing" on page 101).
4. Disconnect the LCD module data and power cables from the front panel board.

⟹ **NOTE**

> The data cable connector on the front panel board has a lever on each side.
> To free the cable from the connector, spread the levers apart (pull their ends
> away from each other). The cable disconnects enough that you can remove
> it fully with your fingers.

5. Remove the screw securing the LCD module to the chassis, and slide the tab on the left side of the LCD module out of the slot. Set the module aside.

Installing the LCD Module

See Figure 27.

1. Connect the LCD module data and power cables to the front panel board. To attach the data cable, insert the connector end of the cable into the connector on the front panel board. This action causes the two levers on the board connector to close slightly. When that happens, push the levers together until the cable connector is fully seated in the board connector.

⇒ **NOTE**

> Verify that both cables are below the sheet of insulating material above the front panel board.

2. Insert the tab on the left side of the LCD module into the slot and insert the screw on the right side of the module that you removed earlier and tighten it firmly (8.0 inch-pounds).
3. Install the fan array housing.
4. Install the memory module cover.
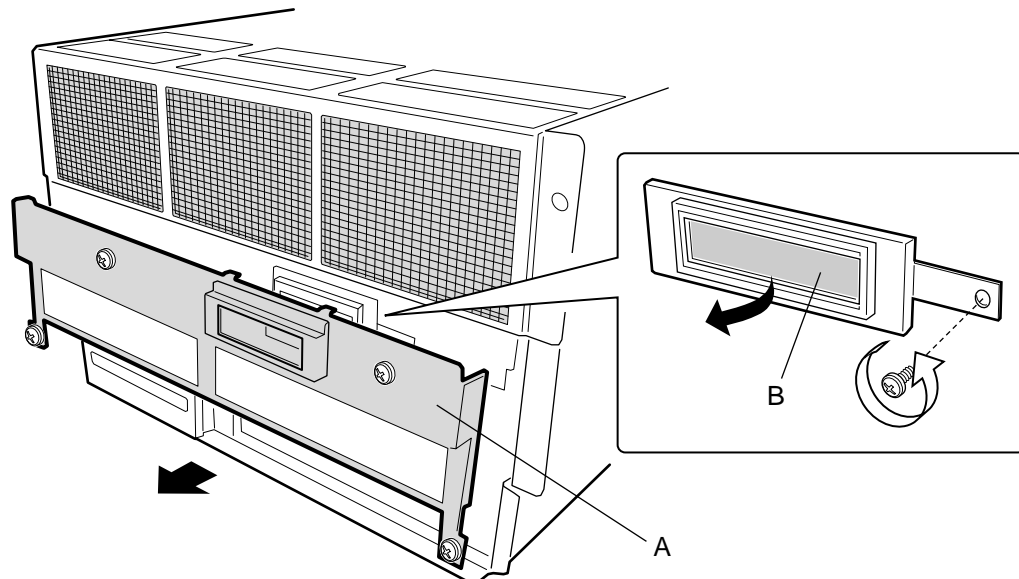
OM10704

Figure 27. Removing the LCD Module

A. Memory module cover
B. LCD module

Profusion Carrier Tray

The profusion carrier tray provides rigid mounting for the front panel board, the profusion carrier, and the memory modules. It also facilitates mating the profusion carrier with the midplane.

Removing the Profusion Carrier Tray

See Figure 28.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the:
    *   Top cover (see "Removing the Top Cover" on page 98).
    *   Memory module cover (see "Removing the Memory Module Cover" on page 100).
    *   Fan array housing (see "Removing the Fan Array Housing" on page 101).
    *   Memory modules (see "Removing a Memory Module" on page 142).
    *   Processors (see "Removing a Processor" on page 148).
3. Remove the ten screws (five each side) that secure the tray to the chassis.
4. Simultaneously rotate the eject/insert levers to eject the tray out of the midplane.
5. Slide the tray from the chassis.

Installing the Profusion Carrier Tray

See Figure 28.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Carefully position the tray on the guide rails and slide the tray into the chassis.

⚠ CAUTION

> Be careful not to pinch the cables coming from the peripheral bay when reinstalling the tray.

3. Ensure that the midplane and profusion carrier tray connectors are properly aligned.
4. Simultaneously rotate the eject/insert levers to mate the tray grand connector with the midplane grand connector. Ensure that the lower tray guide engages with the tray support attached to the peripheral bay.
5. Use the two screws you removed earlier to secure the tray to the chassis.
6. Install the processor retention module.
7. Install the processors (see page 149).

8. Install the memory modules (see page 142).
9. Install the fan array housing (page 101).
10. Install the top cover (page 99) and memory module cover (page 100).
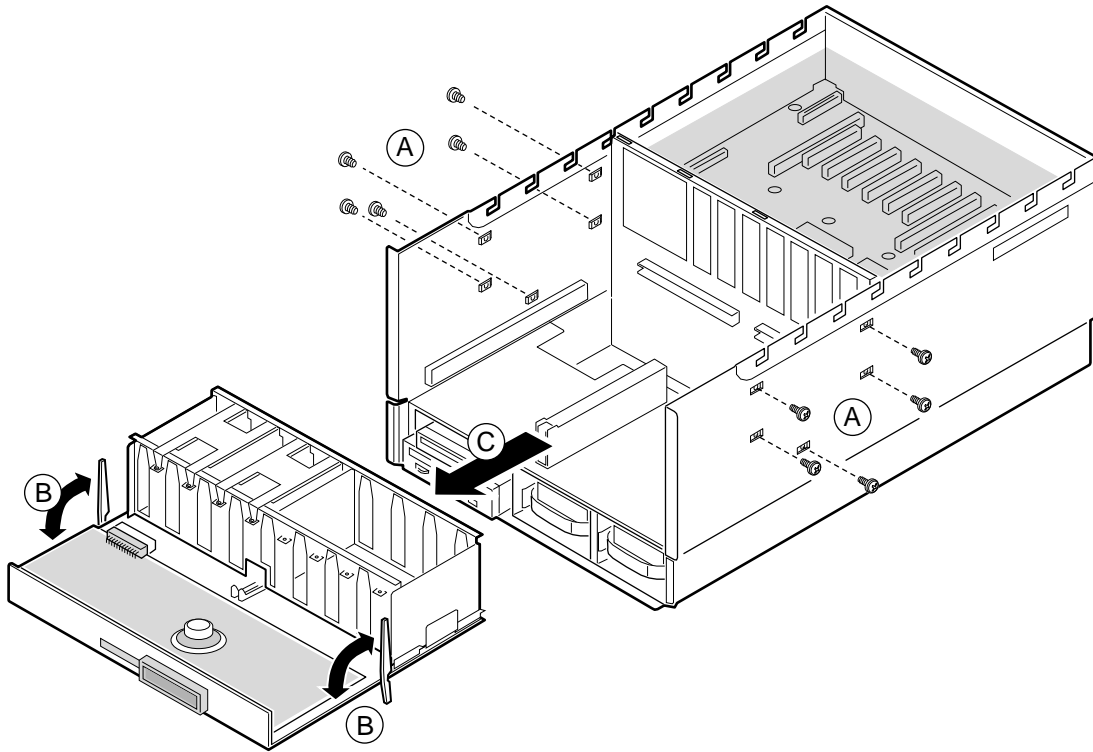
OM10709

Figure 28. Removing the Profusion Carrier Tray

A. Screws (five)
B. Eject/Insert levers
C. Slide the tray from the chassis

Front Panel Controller Board

The front panel board contains the server controls and indicators. It is mounted on snap-on and threaded standoffs on the profusion carrier tray.

Removing the Front Panel Controller Board

See Figure 29.
1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the:
   - Top cover (see "Removing the Top Cover" on page 98).
   - Fan array housing (see "Removing the Fan Array Housing" on page 101).
   - LCD module (see "Removing the LCD Module" on page 102).
3. Remove the insulating material from the front panel controller board.
4. Remove the nine screws that attach the board to the chassis.
5. Using even pressure, slide the board straight toward the front of the chassis. The connector attaching the board to the profusion carrier is at the left (A in Figure 29), so be sure to pull the board STRAIGHT and not twist it.

⚠ **CAUTION**

> When the front panel controller board is free of the profusion carrier tray connector, its switches are surrounded by sheetmetal. Be careful not to damage these switches when lifting the front panel board.

6. Push/pull the front panel board horizontally to free it from the profusion carrier connector, and lift the board from the chassis.
7. Place the board on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing the Front Panel Controller Board

See Figure 29.

⚠ **CAUTION**

> When positioning the front panel board for reinstallation, be sure its switches are in the sheetmetal holes before mating its connector with the profusion carrier. If the switches are not in the holes, they might be damaged.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Position the front panel board over the threaded standoffs with its switches protruding through the sheetmetal holes.
3. Push the board horizontally to mate the connector with the profusion carrier connector.
4. Insert the screws you removed earlier loosely into the threaded standoffs.
5. Make sure the board is properly seated, then tighten all screws firmly (8.0 inch-pounds).

6. Install the LCD module (see "LCD Module" on page 102).
7. Install the insulating material removed earlier from the front panel board.
8. Install the fan array housing (see "Fan Array Housing" on page 101).
9. Install the top cover (see "Installing the Top Cover" on page 99).
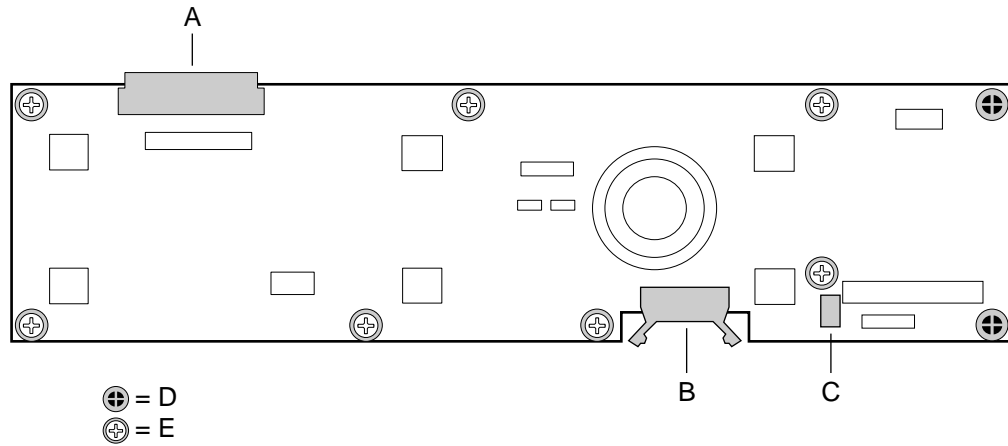
OM07322

Figure 29. Front Panel Controller Board

A. Profusion carrier connector
B. LCD data connector
C. LCD power connector
D. Snap-on standoffs (two)
E. Screws (seven)

Add-In Boards

The PHP I/O carrier provides 10 PCI bus master slots.

⚠ **CAUTION**

Do not overload the PHP I/O carrier by installing add-in boards that draw excessive current. For expansion slot current limitations, see Appendix A, "Power System: Description/Calculating Power Usage" on page 191.

Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from the protective wrapper or from the carrier, place it component-side up on a nonconductive, static-free surface. Do not slide the board over any surface.

⇒ **NOTE**

Running the SSU is optional for a PCI add-in board.

Installing/Replacing an Add-In Board

You can install an add-in board when the server is operating or not operating. The following procedure describes both scenarios.

The enhanced PCI hot-plug (EPHP) mechanism is a rotating part that actuates a switch located on the EPHP board. Each PCI slot has four indicator LEDs: two on the outside and two on the inside of the system. After the LED shows which slot is powered down, you can press the EPHP mechanism on the actuator, rotate the mechanism, and remove the PCI board. After a new PCI board is installed, rotate the EPHP mechanism back into place to activate the switch and secure the board.

See Figure 30 (page 109) and Figure 31 (page 110).

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the PCI bus hot-plug cover (see "Removing the PCI Bus Hot-Plug Cover," page 97).

⚠ **CAUTION**

Some accessory/option board outputs exceed Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the national electric code during installation.
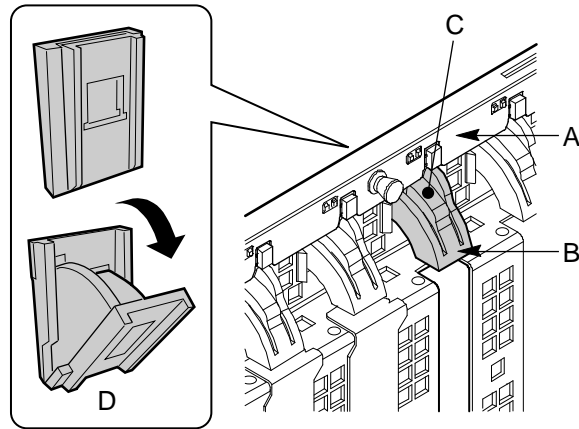
OM08752

Figure 30. Enhanced PHP Functionality on Add-in Board Slots

A. PHP LED board
B. EPHP mechanism
C. EPHP actuator
D. EPHP mechanism, open position

3. Being careful not to touch the components or gold edge connectors on the add-in board, remove it from the protective wrapper, and place it component-side up on a nonconductive, antistatic surface.

4. Record the serial number of the board in your equipment log (see page 197).

5. Set any jumpers or switches according to the board manufacturer's instructions.

6. If your server is not operating, skip this step. If your server is operating:

   • Access the PCI hot-plug utility on the CD-ROM that came with your server.

   • Use the PCI hot-plug utility to power down the appropriate PCI slot.

7. Press the EPHP mechanism on the actuator (C), then rotate the mechanism to free the PCI board from its connector.

8. Remove the I/O slot filler panel for the appropriate slot.

9. Grasp the board by the top edge or upper corners, and firmly press it into an expansion slot on the PHP I/O carrier (see Figure 31). The tapered foot of the processor retaining bracket must fit into the mating slot in the expansion slot frame.

10. Secure the add-in board to the expansion slot frame using the power enabling switch actuator (rotate the EPHP mechanism back into place) and expansion slot cover retaining screw.

11. Connect any required cabling to the add-in board.

12. If your server is not operating, skip this step. If your server is operating:

    • Use the PCI hot-plug utility to power up the PCI slot.

13. Reinstall the top and cover (see "Installing the Top Cover" on page 99).

14. Running the SSU is optional for a PCI add-in board. For information about running this utility, see "Using the System Setup Utility (SSU) " on page 51.
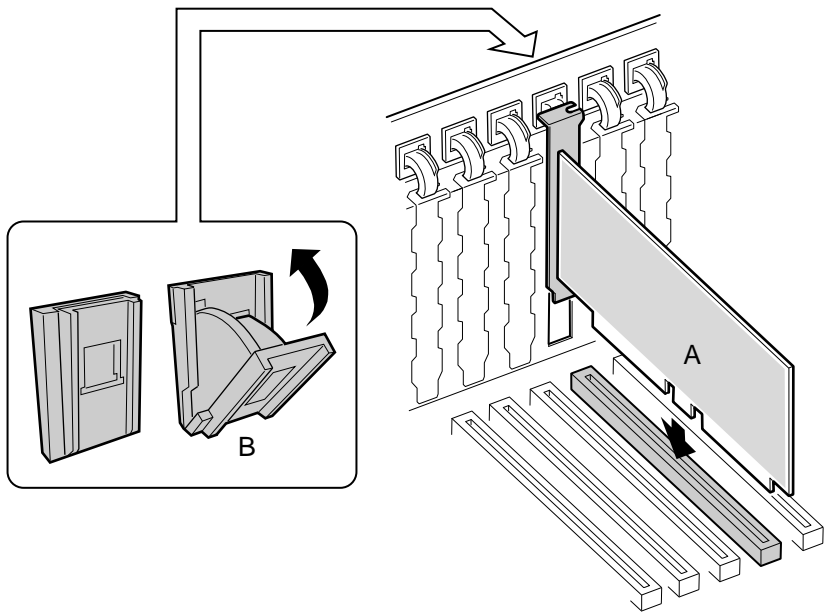
OM10700

Figure 31. Installing an Add-in Board

    A.   Add-In Board
    B.   EPHP Mechanism

Removing an Add-In Board

You can remove an add-in board when the server is operating or not operating. The following procedure describes both scenarios.

⚠ **CAUTION**

> Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emission characteristics of the server and to ensure proper cooling of the server components.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the PCI bus hot-plug cover (see "Removing the PCI Bus Hot-Plug Cover" on page 97).
3. Disconnect any cables attached to the board you are removing.
4. Remove and save the screw securing the add-in board to the expansion slot frame.
5. If your server is NOT operating, skip this step. If your server IS operating:
   - Access the PHP GUI on the CD-ROM that came with your server.
   - Use the PHP GUI to power down the appropriate PCI slot.
6. Grasp the board by the top edge or upper corners, and carefully pull it upward until the edge connector of the board pulls free from the connector on the PHP I/O carrier. Make sure that you do not scrape the board against other components.
7. Store the board in an antistatic protective wrapper.
8. Install an expansion slot cover (see Figure 30 on page 109) over the vacant slot. The tapered foot of the cover must fit into the mating slot in the bottom of the expansion slot frame.
9. Install the power enabling switch actuator over the vacant slot. The spring at the end of the actuator rests on the power enabling switch.
10. Secure the cover and actuator to the frame using the retaining screw.
11. Reinstall the top cover (see "Installing the Top Cover" on page 99).

I/O Riser Board

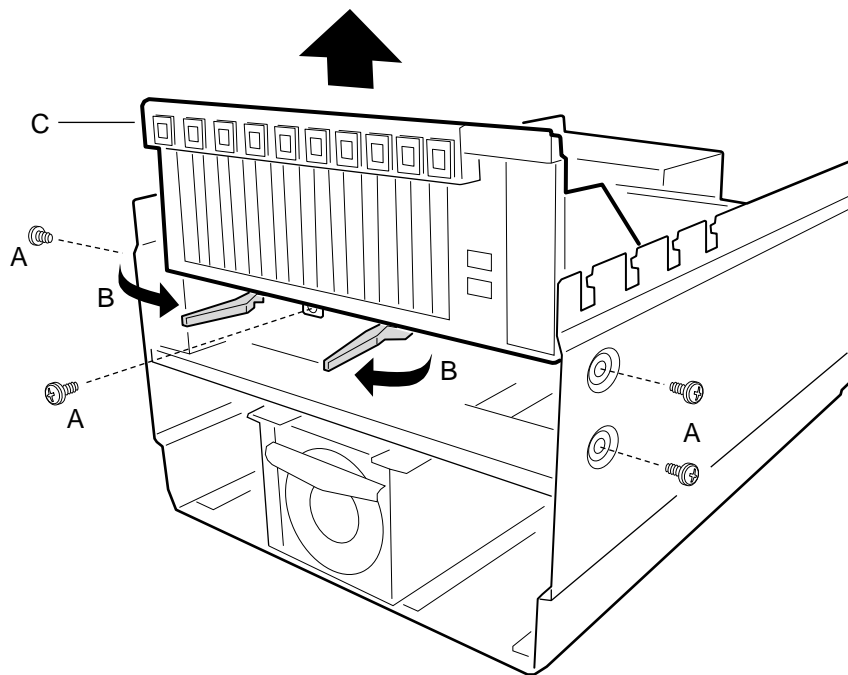## Removing the I/O Riser Board

See Figure 32.
1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Verify that system power is OFF and that the AC power cord is removed from the back of the system, and that all cables (mouse, keyboard, etc.) are disconnected from the I/O back panel.
3. Remove the top cover and 240 VA protective covers (see "Removing the Top Cover" on page 98).
4. Disconnect the ICMB signal cable from the I/O riser board (A in Figure 32).
5. Remove and save the screw (B in Figure 32).
6. Holding the board by the top edge or upper corners, pull it straight upward, away from the PHP I/O carrier until the edge connector of the board pulls free from its connector. Make sure that you do not scrape the board against other components.
7. Place the board on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing the I/O Riser Board

See Figure 32.

1. Remove the I/O riser board from its antistatic protective wrapper.
2. Holding the board by the top edge or upper corners, carefully insert the edge connector of the board into the connector on the PHP I/O carrier. Press the board firmly into the connector until it is fully seated.
3. Insert the screw you removed earlier in the threaded hole in the chassis (B in Figure 32). Tighten the screw firmly (8.0 inch-pounds).
4. Connect the ICMB signal cable to the riser board (A in Figure 32).
5. Reinstall the top and 240 VA protective covers (see "Installing the Top Cover" on page 99).
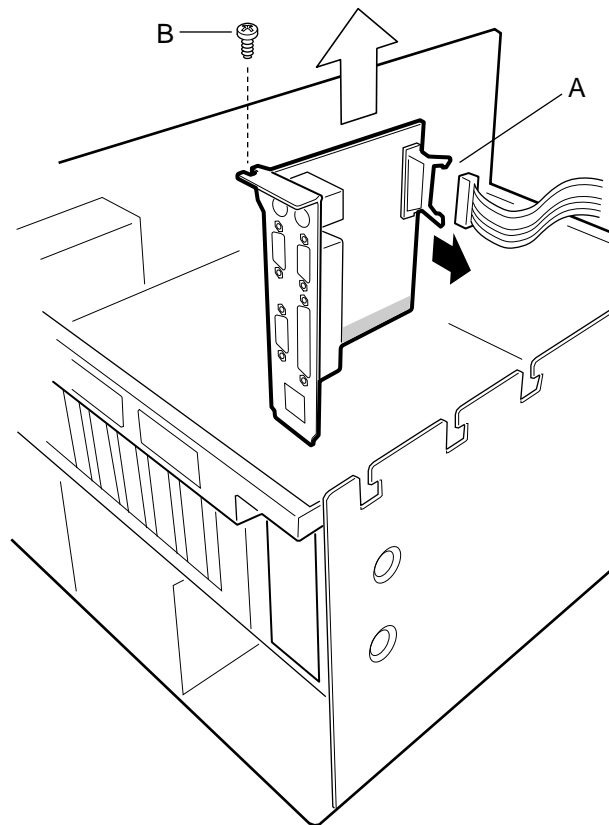
OM07323

Figure 32. I/O Riser Board

A. I/O connector
B. Screw

PHP LED Board

Removing a PHP LED Board

See Figure 33.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the top cover (see "Removing the Top Cover" on page 98).
3. Remove the Non-Hot Plug cover by inserting thumb and forefinger into the two holes on the top of the cover, then carefully lift up it up.
4. Disconnect Plug P2 from the PHP LED board.
5. Press and rotate all PHP switches to the open position.
6. To free the board from the chassis, pull out and disengage the five plastic retaining pins.
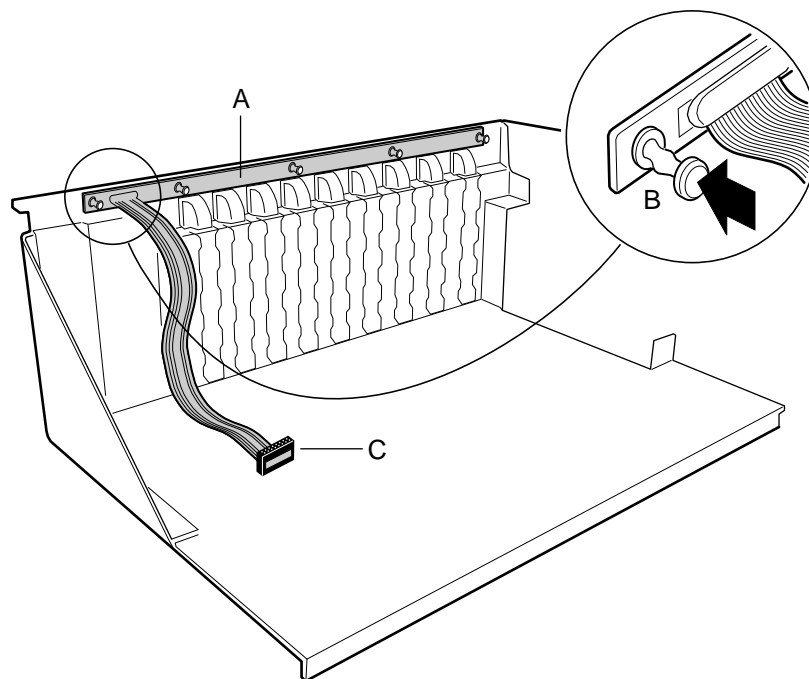
OM08780

Figure 33. PHP LED Board

A.   PHP LED board
B.   Retaining pin
C.   PHP LED cable

Installing a PHP LED Board

See Figure 33.

1. Carefully position the PHP LED board by aligning each of the five plastic retaining pins to their corresponding positions on the chassis.
2. Once aligned, push in the five plastic retaining pins, locking the PHP LED board into position.
3. Connect Plug P2 to the PHP LED board.
4. Replace the Non-Hot Plug cover.
5. Replace the top cover (see "Installing the Top Cover on page 99).

I/O Tray

The I/O tray provides rigid mounting for the PHP I/O carrier and facilitates mating the I/O carrier with the midplane.

Removing the I/O Tray

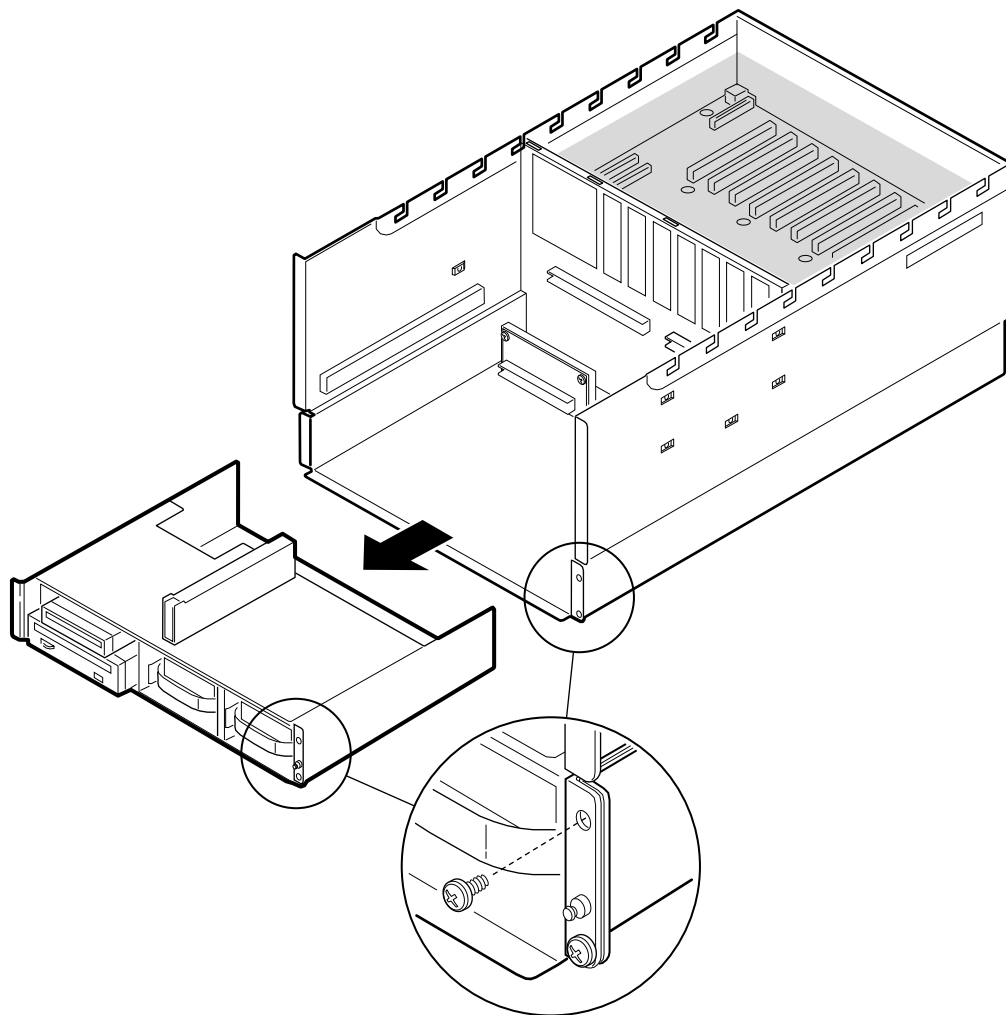See Figure 34.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Verify that system power is OFF and that the AC power cord is removed from the back of the system.
3. Remove the top and 240 VA protective covers (see "Removing the Top Cover" on page 98).
4. Label and disconnect all cables connected to the add-in boards installed in the expansion slots.
5. Remove all add-in boards (see "Add-In Boards" on page 108).
6. Label and disconnect all internal cables connected to the PHP I/O carrier.
7. Remove and save the four screws securing the tray to the chassis.
8. Simultaneously rotate the eject/insert levers to eject the tray from the midplane. The levers are labeled "B" in Figure 34.
9. Lift the tray from the chassis.

Installing the I/O Tray

See Figure 34.

1. Position the tray over the chassis and lower it onto its supports.
2. Ensure that the midplane and I/O carrier tray connectors are properly aligned.
3. Simultaneously rotate the eject/insert levers into the locked position. This action also mates the PHP I/O carrier connector with the midplane connector.
4. Use the screws you removed earlier to secure the I/O tray to the chassis.
5. Connect all internal cables to the PHP I/O carrier.
6. Install all add-in boards (see "Add-In Boards" on page 108).
7. Connect all peripheral device cables connected to the I/O panel on the back of the system.
8. Install the top and 240 VA protective covers (see "Installing the Top Cover" on page 99).

OM10653

Figure 34. Removing the I/O Tray

    A.   Screws (four)
    B.   Eject/insert levers
    C.   I/O tray
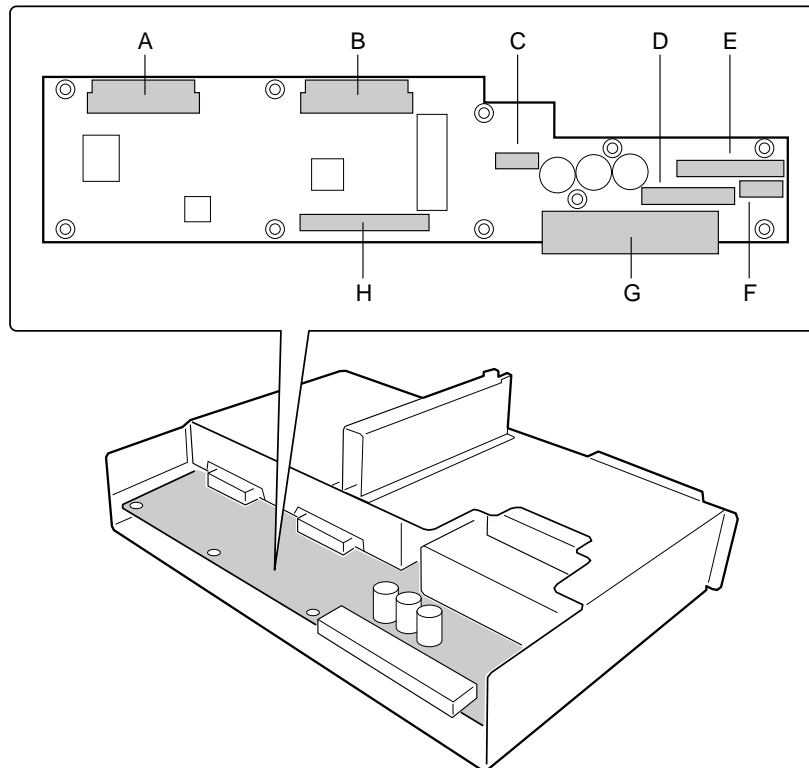
Interchassis Management Bus (ICMB) Board

Removing the ICMB Board

See Figure 35.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the top and 240 VA protective covers (see "Removing the Top Cover" on page 98).
3. Disconnect the ICMB signal cable from its connector on the I/O riser board.
4. Remove and save the screw that attaches the ICMB board to the I/O tray.
5. Push on the tabs of the snap-on standoff and pull the board toward the front of the chassis to remove it from the snap-on standoff.
6. Place the board on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing the ICMB Board

See Figure 35.

1. Remove the ICMB board from its protective wrapper.
2. Position the board over the snap-on and threaded standoffs on the I/O tray.
3. Press the board onto the snap-on standoff, and insert the screw loosely into the threaded standoffs.
4. Make sure the board is properly aligned, then tighten the screw firmly (8.0 inch-pounds).
5. Connect the signal cable to its connector on the I/O riser board.
6. Reinstall the top and 240 VA protective covers (see "Installing the Top Cover" on page 99).
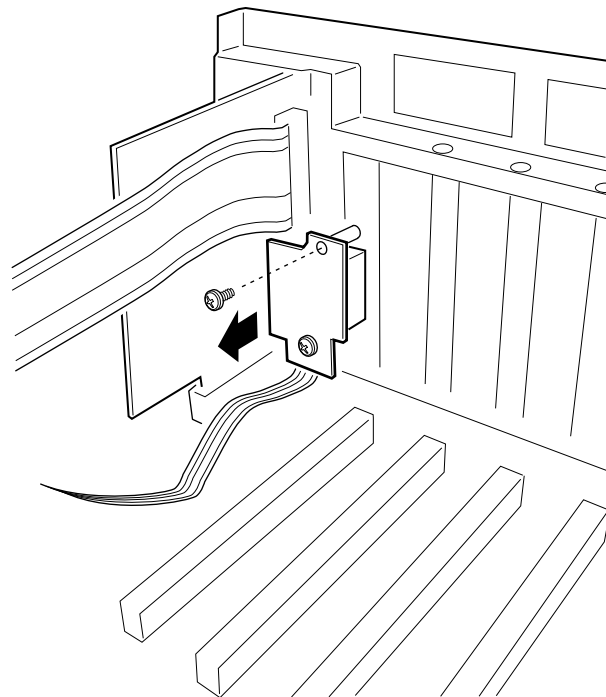
OM07518

Figure 35. Removing the ICMB Board

AC Filter and Cable

Removing the AC Filter and Cable

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the midplane, but leave it attached to its support bracket (see "Removing the Midplane" on page 140).
3. Remove and save the screws that attach the AC filter to that chassis.
4. Remove and save the screws that attach the AC plugs to the chassis.
5. Remove the three plug retaining brackets.
6. Remove the AC filter and cable.

Installing the AC Filter and Cable

1. Remove the AC filter and cable from its protective wrapper.
2. Place the cable in position inside the chassis.
3. Install the three plug retaining brackets; secure them with the screws you removed earlier.
4. Install the AC filter.
5. Install the midplane (see "Installing the Midplane" on page 140).

Peripheral Bay

⚠ **CAUTION**

Be careful not to scrape the diskette drive data cable on memory DIMMs when you remove or install the peripheral bay. Damage to the cable and DIMMs could occur.

Removing the Peripheral Bay

See Figure 36.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the memory module cover (see "Removing the Memory Module Cover" on page 100).
3. Remove and save the four screws that secure the peripheral bay to the chassis.
4. Using the profusion carrier support as a handle (the rectangular metal piece that protrudes vertically from the top of the peripheral bay), slide the bay straight out, away from the center of the chassis.

Installing the Peripheral Bay

See Figure 36.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Position the peripheral bay so that it rests on the bottom of the chassis with the drives facing the chassis front.
3. Using the profusion carrier support as a handle, slide the peripheral bay straight inward, toward the center of the chassis.
4. Use even pressure to mate the connector on the back of the peripheral bay (on the peripheral bay backplane) to the blind mate board in the chassis.
5. Install the four screws removed earlier.
6. Install the memory module cover (see "Installing the Memory Module Cover" on page 100).

OM07508

Figure 36. Peripheral Bay

Peripheral Bay Backplane

Removing the Peripheral Bay Backplane

See Figure 37.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove SCSI drives from peripheral bay (see "Hot-Swapping a SCSI Hard Drive" on page 84).
3. Remove peripheral bay (see "Removing the Peripheral Bay" on page 117).
4. Label and disconnect the diskette and CD-ROM power and data cables from the backplane.
5. Remove and save the eight screws that attach the backplane to the peripheral bay.
6. Lift the backplane straight up and away from the peripheral bay.
7. Place the board on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing the Peripheral Bay Backplane

See Figure 37.

1. Remove the board from its protective wrapper.
2. Position and align the board over the two alignment pins.
3. Attach the eight screws removed earlier.
4. Connect the diskette and CD-ROM power and data cables to their connectors on the backplane.
5. Install the peripheral bay in the chassis (see "Installing the Peripheral Bay" on page 118).
6. Install SCSI drives (see "Hot-Swapping a SCSI Hard Drive" on page 84).

OM07503

Figure 37. Peripheral Bay Backplane

- A. Hot-swap hard disk drive connector
- B. Hot-swap hard disk drive connector
- C. Power connector
- D. Diskette drive data connector
- E. CD-ROM drive data connector
- F. Dual CD-ROM/diskette drive power connector
- G. Blind mate board connector
- H. SCSI cable connector

Peripheral Bay Blind Mate Board

Removing the Peripheral Bay Blind Mate Board

See Figure 38.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the profusion carrier tray (see "Removing the Profusion Carrier Tray" on page 104).
3. Remove the peripheral bay (see "Removing the Peripheral Bay" on page 117).
4. Label and disconnect all cables connected to the blind mate board (see Figure 39, on page 123).
5. Remove and save the two screws that attach the board to its support in the chassis, then remove the board.
6. Place the board on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.
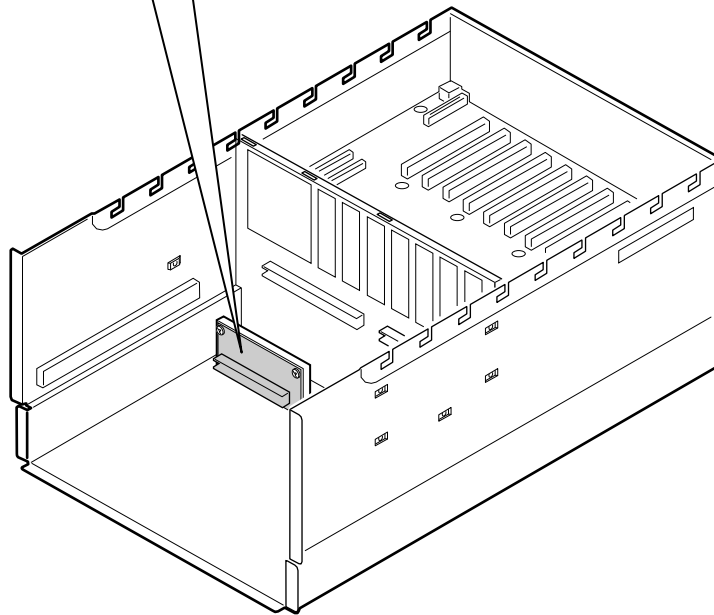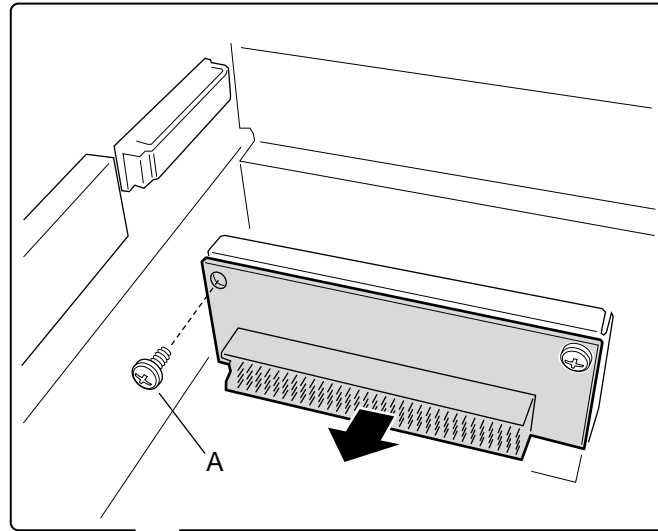
OM10701

Figure 38. Peripheral Bay Blind Mate Board

A.   Screws (two)
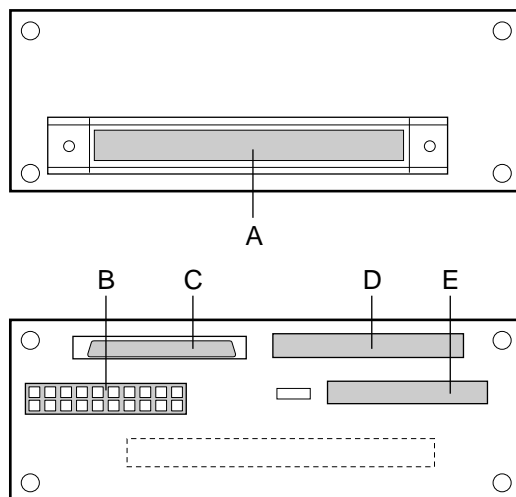
OM10708

Figure 39. Peripheral Bay Blind Mate Board Cables

A. Blind Mate connector header
B. 20-pin power connector
C. Wide SCSI connector
D. 40-pin IDE connector
E. 34-pin header (floppy)

Installing the Peripheral Bay Blind Mate Board

See Figure 38.

1. Remove the board from its protective wrapper.
2. Position the board against its support in the chassis, then attach it with the four screws you removed earlier.
3. Connect all previously removed cables to the board.
4. Install the peripheral bay (see "Installing the Peripheral Bay").
5. Install the profusion carrier tray (see "Installing the Profusion Carrier Tray" on page 104).

Diskette Drive

Removing the Diskette Drive

See Figure 40.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the peripheral bay (see "Removing the Peripheral Bay" on page 117).
3. Remove retaining screw at the front side of the diskette drive.

➡ **NOTE: Cabling for Diskette and CD-ROM Drives**

You cannot remove the diskette drive from the chassis by simply removing its cables from the peripheral bay backplane. The diskette drive power cable attaches to the back of the CD-ROM drive. A power cable for both drives exits the CD-ROM and connects to the peripheral bay backplane. Therefore, you must remove cables from the drives themselves to remove a particular drive.

4. Disconnect the power and data cables from the diskette drive.
5. Pull the diskette drive forward and out of the peripheral bay.

A. Screw attaching the drive/carrier assembly to the chassis

B. Screws attaching the carrier to the drive
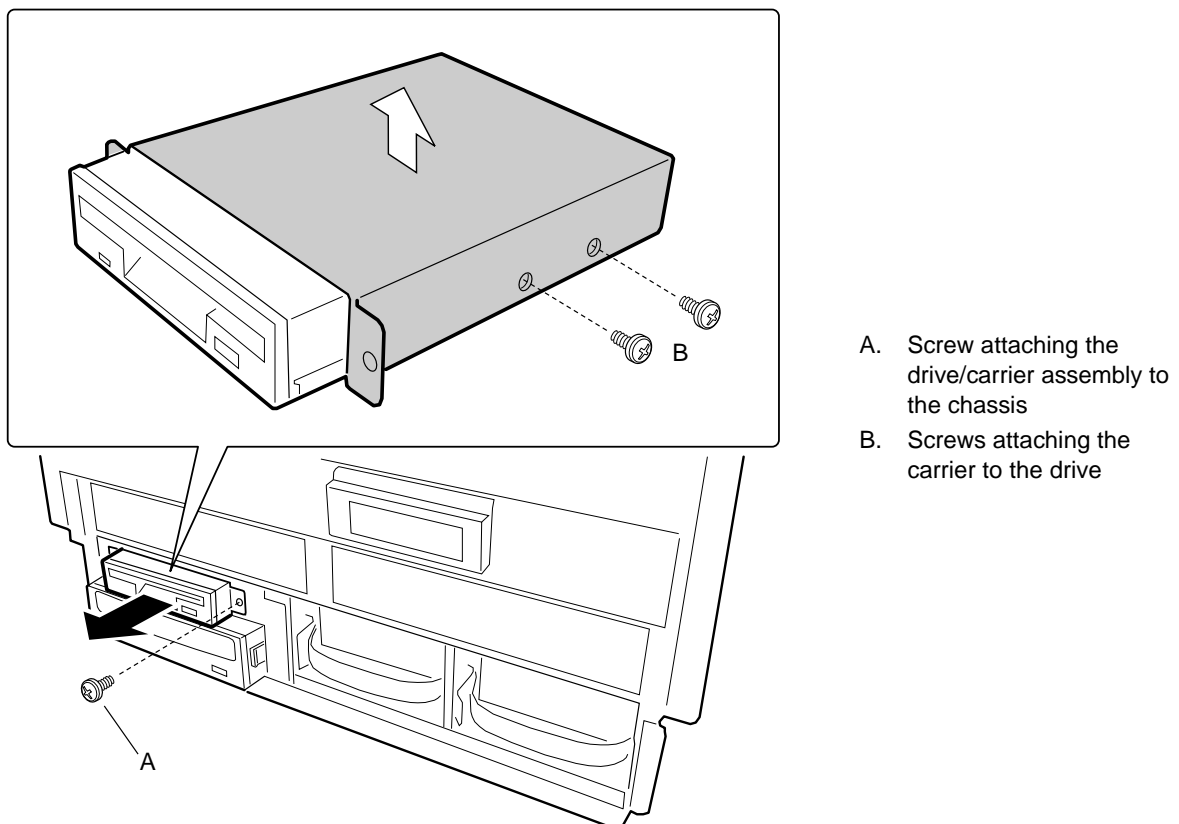
OM07360

Figure 40. Removing the Diskette Drive

6. Place the drive/carrier assembly component-side up on an antistatic surface.
7. Remove and save the screws that hold the carrier to the drive.
8. Place the drive in an antistatic protective wrapper.

Installing the Diskette Drive

1. Remove the new 3.5-inch diskette drive from its protective wrapper, and place it component-side up on an antistatic surface. Record the drive model and serial numbers in your equipment log (see page 197).
2. Set any jumpers or switches according to the drive manufacturer's instructions.
3. Place the drive carrier on the noncomponent side of the drive, and align the mounting holes.
4. Attach the carrier to the drive with screws of the appropriate size and length (reuse the screws you removed before). Tighten the screws firmly (between 4.0 and 6.0 inch-pounds).
5. Position the drive in its opening in the front of the chassis, on top of the CD-ROM drive.
6. Slide the drive into the chassis until the frame of the carrier rests against the front of the chassis. When positioned properly, the tab on the left of the carrier mates with its corresponding slot in the chassis, and the screw hole on the right of the carrier aligns with its corresponding hole in the chassis.
7. Secure the drive/carrier assembly to the chassis with the screw you removed earlier; tighten the screw firmly (6.0 inch-pounds).
8. Connect the data and power cables to the drive.
9. Install the peripheral bay (see "Installing the Peripheral Bay" on page 118).
10. Run the SSU to specify that the diskette drive is installed in the system.

Peripheral Drives

Installing a 5.25-inch Peripheral in the Front Bay

One 5.25-inch half-height bay provides space for a tape backup, CD-ROM, or other removable media drive.

⚠ **CAUTIONS**

> **Do not install hard drives in 5.25-inch bays:** We recommend that you do NOT install hard drives in the 5.25-inch bays. The drives cannot be properly cooled in this location; also, a hard drive generates EMI and is therefore more susceptible to ESD in this location.

⟹ **NOTES**

> **Save the filler panels and EMI shields:** System EMI integrity and cooling are both protected by having drives installed in the bays or filler panels and EMI shields covering the bays. When you install a drive, save the panel and shield to reinstall in case you should later remove the drive and not reinstall one in the same bay.

> **Bus termination when installing SCSI devices:** It is important that your cabling and connections meet the SCSI bus specification. Otherwise, the bus could be unreliable and data corruption could occur or devices might not work at all. The SCSI bus needs to be terminated at the end of the cable; this is usually provided by the last SCSI device on the cable. For more information on connecting the data cable to a drive, see step 9 on page 127.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the peripheral bay (see "Removing the Peripheral Bay" on page 117).
3. Remove the drive from its protective wrapper, and place it on an antistatic surface.
4. Record the drive model and serial numbers in your equipment log (page 197).
5. Set any jumpers or switches on the drive according to the drive manufacturer's instructions.
6. Using two screws of the appropriate size and length (not supplied), attach each plastic slide rail and its metal grounding plate to the drive.
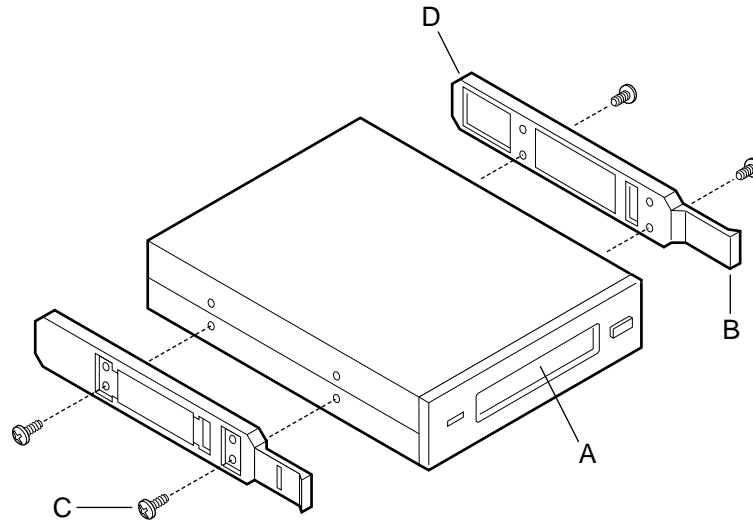
OM08013

Figure 41. Snap-in Plastic Slide Rails

- A.   Tape drive or other removable media device
- B.   Tab on slide rail
- C.   Screws (4)
- D.   Slide rails (2)

7.   Position the drive so the plastic slide rails engage in the bay guide rails. Push the drive into the bay until the slide rails lock in place.
8.   Connect a power cable to the drive. The connectors are keyed and can be inserted in only one way.
9.   Connect the data cable to the drive. The connectors are keyed and can be inserted in only one way.

Removing a 5.25-inch Peripheral from the Front Bay

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the peripheral bay (see "Removing the Peripheral Bay" on page 117).
3. Disconnect the power and data cables from the drive.
4. The drive has two protruding plastic, snap-in rails attached. Squeeze the rail tabs toward each other as you carefully slide the drive forward out of the bay, and place it on an antistatic surface.
5. Remove and save the four screws and two slide rails.
6. If you leave the bay empty, install a stainless steel EMI shield on the bay for proper cooling and airflow.
7. If you do not replace a SCSI device with another SCSI device, modify the cable and termination arrangement so that a proper termination exists at the end of the cable (it can be a termination device only, not necessarily a SCSI peripheral).
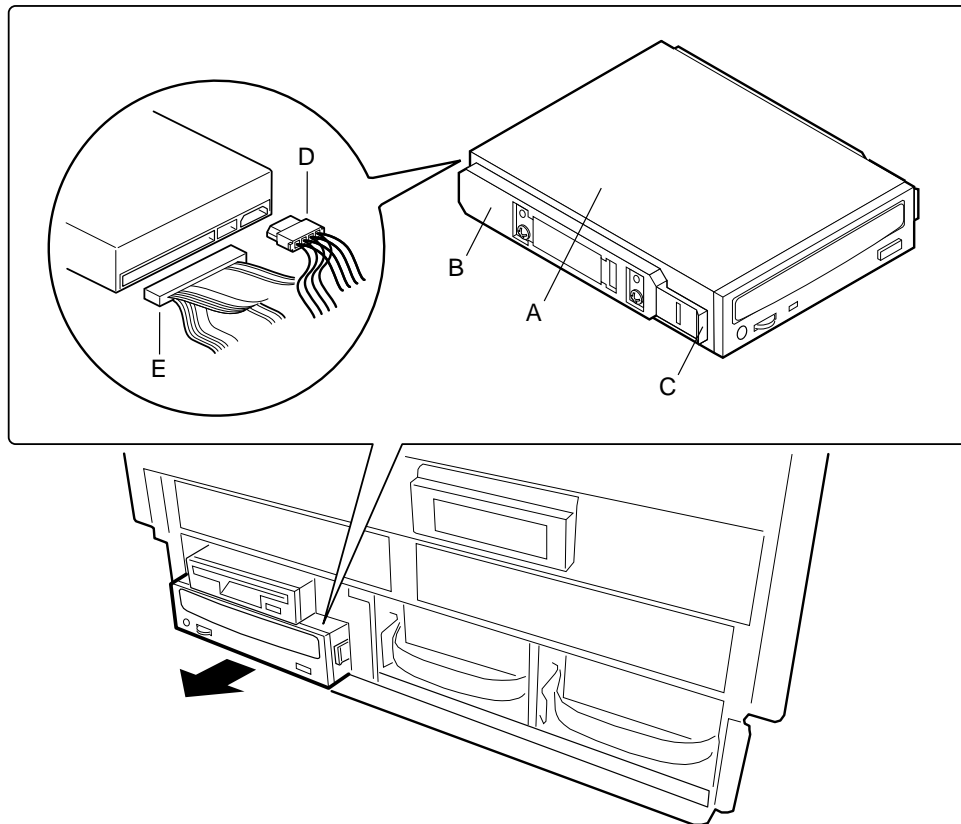
OM07359

Figure 42. Removing a Media Device

A. CD-ROM Drive
B. Plastic snap-in slide rail
C. Retaining tab on rail
D. Power cable
E. Data cable

6 Upgrading Boardset Components

This chapter describes procedures for removing and installing major system boards and components. This includes procedures for:

Table 15. Procedures in Chapter 6

Item	Page	Item	Page
• Cache Coherency Filters	134	• Midplane	140
• Processor retention bracket	134	• Memory modules and DIMMs	142
• Mezzanine board(s)	135	• Processors	147
• Profusion carrier	136	• FSB Termination Board Assembly	150
• PHP I/O carrier	138	• Backup battery	152

Tools and Supplies Needed

- Phillips (cross-head) screwdriver (#1 and #2 bit)
- Small flat-bladed screwdriver
- Jumper removal tool or needle-nosed pliers
- Antistatic wrist strap and conductive foam pad (recommended)
- Pen or pencil
- Equipment log: as you integrate new parts into the system, add information about them to your equipment log (page 197). Record the model and serial number of the system, all installed options, and any other pertinent information specific to the system. You will need this information when running the SSU.

Warnings and Cautions

These warnings and cautions apply throughout this manual to any procedure in which you access the inside of the server.

⚠ WARNINGS

Avoid burns: If the system has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, be careful when removing or installing components that are located near processors.

System power on/off: The DC push-button on/off switch (a convex button) on the front panel DOES NOT turn off the system AC power. To remove power from system, you must unplug ALL AC power cords from the wall outlet.

Hazardous conditions, devices, and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the system and disconnect all power cords, telecommunications systems, networks, and modems attached to the system before opening it. Otherwise, personal injury or equipment damage can result.

⚠ CAUTIONS

Electrostatic discharge (ESD) & ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you do all procedures in this chapter only at an ESD-protected workstation. If one is not available, provide some ESD protection by wearing an antistatic wrist strap attached to chassis ground—any unpainted metal surface—on your system when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the system, place it component-side UP on a grounded, static-free surface. Use a conductive foam pad if available, but NOT the board wrapper. Do not slide board over any surface.

Chassis covers, proper cooling, and airflow: For proper cooling and airflow, always install the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts.

Installing or removing jumpers: A jumper is a small, plastic-encased conductor that slips over two jumper pins. Newer jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine, needle-nosed pliers. If your jumpers do not have such a tab, take care when using needle-nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to gently grip, but not squeeze, with the pliers or other tool you use to remove a jumper; you might bend or break the stake pins on the board.

Cache Coherency Filters: Removing and Installing

Removing the Cache Coherency Filters

See Figure 43.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Mezzanine Extraction Tool/Cache Hold Down bracket from the front of the processor retention bracket by pulling out the plastic retaining pin.
3. Press down on the retaining latch, and pull the filter up and out of the connector.
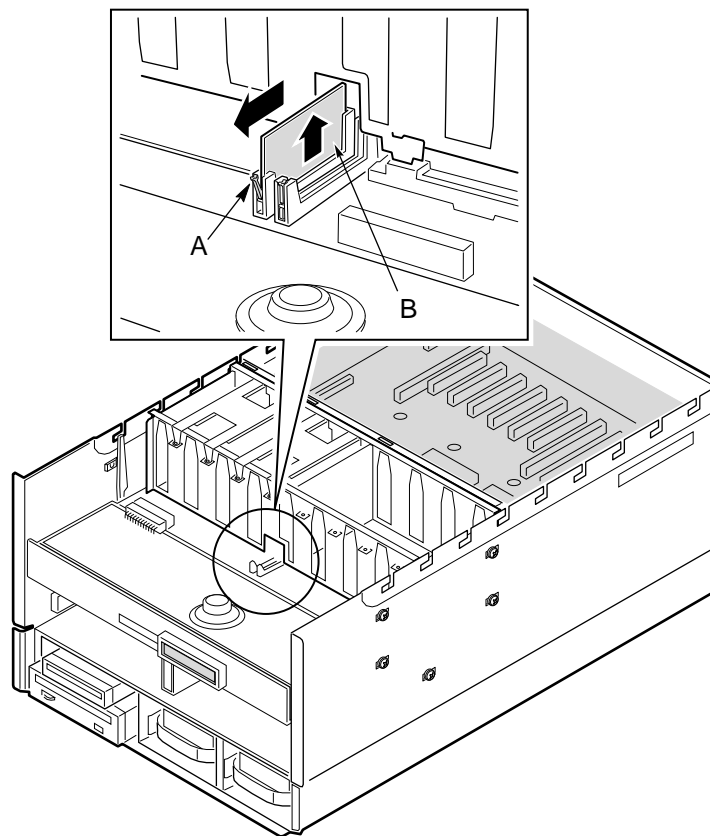
OM10691

Figure 43. Removing the Cache Coherency Filters

      A.   Retaining latch
      B.   Keyed/notched edge

Installing the Cache Coherency Filters

⚠ **NOTE**

> If the profusion carrier tray is removed, we recommend that you install the
> cache coherency filters before installing the profusion carrier tray.

See Figure 43.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Mezzanine Extraction Tool/Cache Coherency Hold Down from the front of the processor retention bracket by pulling out the plastic retaining pin.
3. With the keyed or notched edge of the filter oriented toward the back of the system, insert the filter into the connector.
4. Press down firmly on the filter until the front lock retaining latch moves to the locked position.
5. Push up on the retaining latch to ensure the filter is properly locked into position.
6. Replace the hold down bracket by aligning the tab and the plastic retaining pin on the front of the processor retention bracket. Once aligned, push in on the pin, locking the bracket in place.

Processor Retention Bracket: Removing and Installing

Removing the Processor Retention Bracket

See Figure 44.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the memory module (page 142).
3. Remove the profusion carrier tray (page 104).
4. Remove the cache coherency filters (page 132).
5. Find the four metal latch verification brackets located on each side of the profusion carrier tray (two on each side).
6. To release the latches, pull up and out on each tab and expose the four plastic mezzanine lock bars (two on each side).
7. Release the plastic mezzanine lock bars by simultaneously squeezing the winged protruding end of the lock bar and pulling out and away from the profusion carrier tray.
8. Carefully lift the processor retention bracket from the profusion carrier tray.
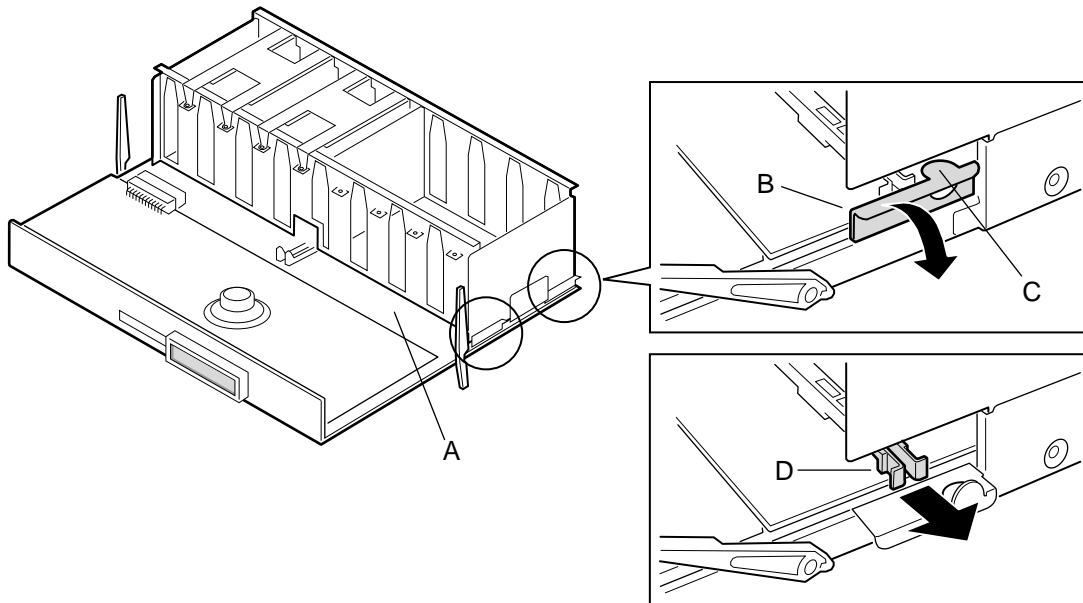
OM10654

Figure 44. Removing the Processor Retention Bracket

A. Profusion carrier tray
B. Metal latch verification bracket
C. Tab
D. Plastic mezzanine lock bars

Installing the Processor Retention Bracket

See Figure 44.
1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Carefully align the processor retention bracket guideposts (larger guide on the right) with the bracket guides on the profusion carrier tray.
3. Ensure that all the guides for each mezzanine board are properly aligned. Lock the plastic mezzanine lock bars by squeezing the winged end of the plastic lock bar while simultaneously pushing in toward the profusion carrier tray. Lock all four mezzanine lock bars.
4. Push up and in on the metal latch verification brackets. All four metal latches must be in the up position before reinstalling the profusion carrier tray.

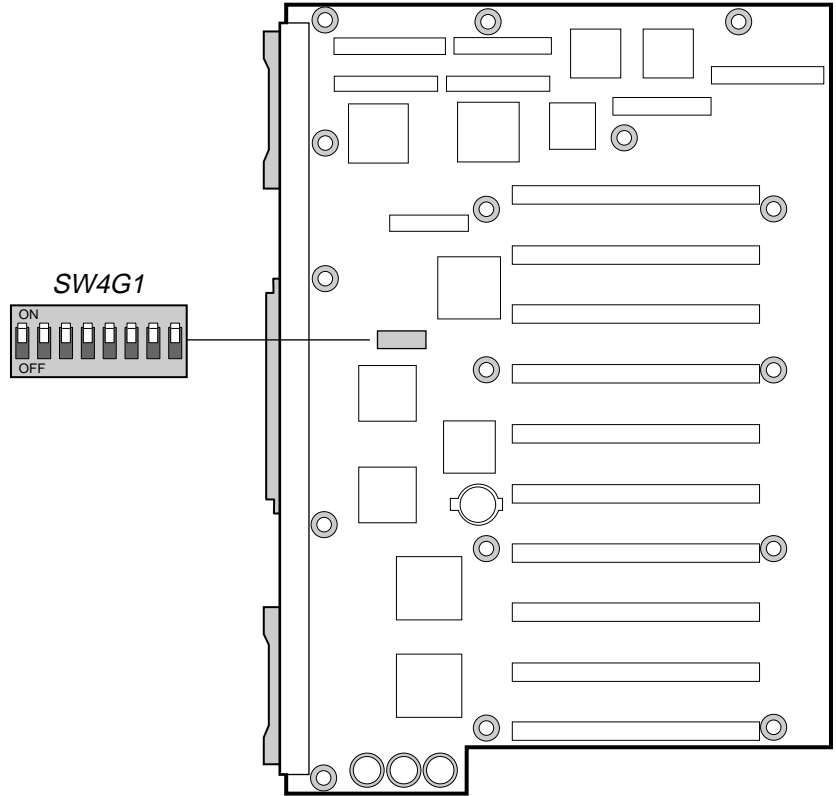# Mezzanine Board(s): Removing and Installing

Removing the Mezzanine Board(s)

See Figure 45.
1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the memory module (page 142).
3. Remove the profusion carrier tray (page 104).
4. Remove the processor retention bracket (page 134).
5. Remove the Mezzanine Extraction Tool/Cache Hold Down from the front of the processor retention bracket.
6. Insert the flange end (without foam) under the edge of the mezzanine board at the place marked "insert extraction tool here".
7. Using the grand connector as a fulcrum, press down on the opposite end of the tool as it lifts the rear end of the board.
8. Set the tool aside and lift on both the front edge and the rear edge of the mezzanine board to unseat it from the profusion carrier board.

Installing the Mezzanine Board(s)

⚠ CAUTION

Please follow these procedures carefully. The mezzanine board does not have a keying feature and can be installed incorrectly.

1. Prior to seating the mezzanine board onto the connector, orient the board so that the white alignment marker on the board (lower right corner) is aligned with the white alignment arrow located on the profusion carrier. The white number label will be on the left size of the mezzanine board.
2. Look under the board to ensure that it is properly aligned with the profusion carrier, and not improperly aligned with components or processor slots.
3. Push down firmly in the middle area of the mezzanine board until it's flush with the profusion carrier.

Profusion Carrier: Removing and Installing

Removing the Profusion Carrier

See Figure 45.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the memory module (page 142).
3. Remove the cache coherency filters (page 132).
4. Remove the profusion carrier tray (page 104).
5. Remove the processor retention bracket (page 134).
6. Remove the mezzanine board(s) (page 135).
7. Remove the front panel controller board (page 106).
8. Remove the screws in the base of the S.E.C. cartridge guides.
9. Remove the cartridge guides—they come out as one unit—and set them aside.
10. Remove the screws securing the profusion carrier to the chassis.
11. Lift the profusion carrier to unsnap it from the snap-on standoffs.
12. Place the carrier on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing the Profusion Carrier

See Figure 45.

1. Remove the profusion carrier from its protective wrapper.
2. Position the carrier over the snap-on and threaded standoffs on the profusion tray.
3. Press the carrier onto the snap-on standoffs, and insert the screws loosely into the threaded standoffs.
4. Position the cartridge guides over the profusion carrier and loosely insert the retaining screws into the threaded standoffs.
5. Make sure the carrier is properly seated, then tighten all screws to 8.0 inch-pounds.
6. Install the mezzanine board(s) (see page 135).
7. Install the front panel board.
8. Install the profusion tray.
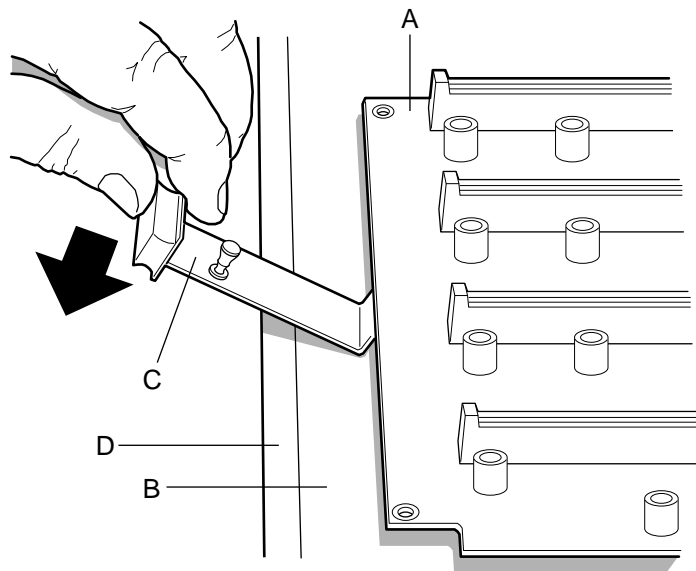
OM08755

Figure 45. Separating the Profusion Carrier and Processor Mezzanine Boards

A. Processor mezzanine board
B. Profusion carrier
C. Mezzanine extraction tool/cache hold down
D. Grand connector

PHP I/O Carrier: Removing and Installing

⚠ CAUTION

The PHP I/O carrier can be extremely sensitive to ESD and always requires careful handling. After removing the carrier from the server, place it component-side up on a nonconductive, static-free surface to prevent shorting out the battery leads. If you place the carrier on a conductive surface, the back-up battery leads may short out. If they do, this will result in a loss of CMOS data and will drain the battery. Do not slide the carrier over any surface.

Removing the PHP I/O Carrier

See Figure 46

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the I/O Tray (see "I/O Tray" on page 114).
3. Remove the I/O riser board (see "I/O Riser Board" on page 111).
4. Remove the ICMB board (see "Interchassis Management Bus (ICMB) Board" on page 116).
5. Remove all power switch activators and covers.
6. Remove and save the screws that attach the PHP I/O carrier to the tray.
7. Pull the carrier upward and unsnap it from the snap-on standoffs.
8. Place the carrier on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing the PHP I/O Carrier

See Figure 46.

1. Remove the PHP I/O carrier from the antistatic protective wrapper if you placed it in one.
2. Position the carrier over the snap-on and threaded standoffs on the center bulkhead of the chassis.
3. Press the carrier onto the snap-on standoffs, and insert the screws loosely into the threaded standoffs.
4. Make sure the carrier is properly seated, and tighten all screws firmly (8.0 inch-pounds).
5. Install the I/O riser board.
6. Install the ICMB board.
7. Install the I/O tray.

Run the SSU, and use the saved configuration file to restore all options to the same settings. For information about running this utility, see "Using the System Setup Utility (SSU)".

SW4G1

ON

OFF

OM08749

Figure 46. PHP I/O Carrier

Midplane: Removing and Installing

Removing the Midplane

See Figure 47.

⚠ **CAUTION**

> Disconnect EVERYTHING from the midplane before trying to remove it.
> Failure to do so can result in serious damage to the midplane and any
> components still connected to the midplane.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the power supplies (see "Hot-Swapping Power Supplies" on page 88).
3. Remove the profusion carrier tray (see "Profusion Carrier Tray" on page 104).
4. Remove the I/O tray (see "I/O Tray" on page 114).
5. Remove the three screws that attach the upper midplane support bracket to the chassis.

⚠ **CAUTION**

> As you remove the upper bracket, make sure the edge of the bracket does not
> gouge or slice the ribbon cables that are routed between the bracket and the
> chassis wall.

6. Remove the upper bracket by pulling it straight up, out of the chassis.
7. Remove the four screws that attach the lower bracket/midplane assembly to the chassis.
8. Remove the bracket/midplane assembly by pulling it straight up, out of the chassis.
9. To remove the midplane from its support bracket, remove and save the seven screws that attach the two parts.
10. Place the midplane on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing the Midplane

See Figure 47.
1. Remove the midplane from its protective wrapper.
2. Position the midplane on its support bracket and insert the screws loosely into the threaded standoffs.
3. Make sure the midplane is properly positioned, then tighten all screws firmly (8.0 inch-pounds).
4. Install the midplane/support bracket assembly in the chassis, then secure it with the four screws you removed earlier.

⇒ **NOTE**

      The UPPER midplane support bracket has a number of slots that mate with
      rectangular tabs on the top of the midplane.

5. Install the upper midplane support bracket, then secure it with the three screws you removed earlier.
6. Install the I/O tray.
7. Install the profusion carrier tray.
8. Install power supplies.
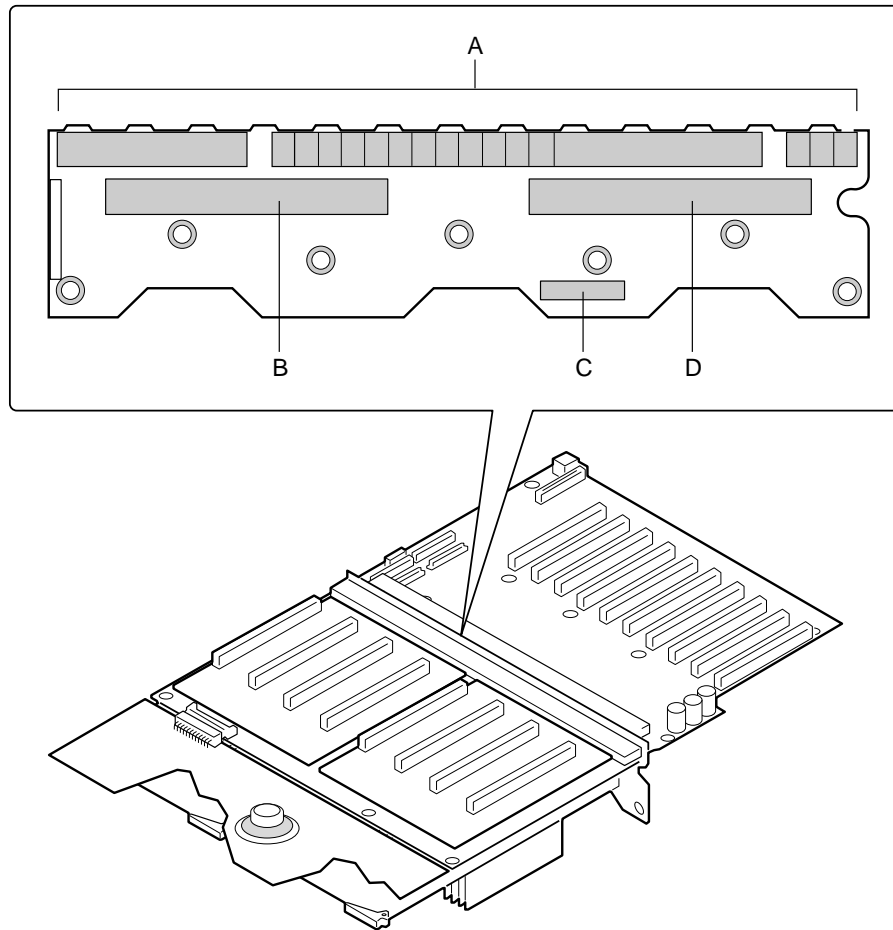
OM07504

Figure 47. Midplane

    A.   Grand connector
    B.   Memory module connector
    C.   Peripheral power connector
    D.   Memory module connector

Memory Modules and DIMMs: Removing and Installing

⚠ CAUTION

> To avoid damaging the memory module DIMM sockets, do not attempt to use the metal stiffener on the memory module as a handle.

Removing a Memory Module

See Figure 48.
1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the memory module cover (A) (see "Removing the Memory Module Cover" on page 100).
3. Simultaneously rotate the eject/insert levers of the memory module outward about 90° to disengage the pin-and-socket connector of the module from the pin-and-socket connector of the midplane.

⚠ CAUTION: Support Memory Module During Removal

> Support the entire length of the memory module as you slide it out of the chassis. The module is more than 12 inches long and could be damaged if you allow it to bend by supporting only one end.

4. Being careful not to touch the components on the memory module, slide it out of the slot guides.
5. Place the module DIMM-side up on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

Installing a Memory Module

See Figure 48.
1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Being careful not to touch the components on the memory module, remove it from its protective wrapper. Place the module DIMM-side up on a nonconductive, static-free surface.
3. Record the serial number of the memory module in your equipment log (page 197).
4. Remove any installed DIMMs from the module you removed earlier. Install them in the new memory module.

⟹ NOTE

> Install the memory module DIMM-side down.

5. Grasp the memory module by the sides and carefully slide it into the slot guides until the levers engage with the flanges in front of the guides.
6. Simultaneously rotate the levers inward until they are flush with the edge of the module to seat the connector of the module in the connector of the midplane.
7. If you removed the LCD module, reinstall it.
8. Reinstall the memory module cover.
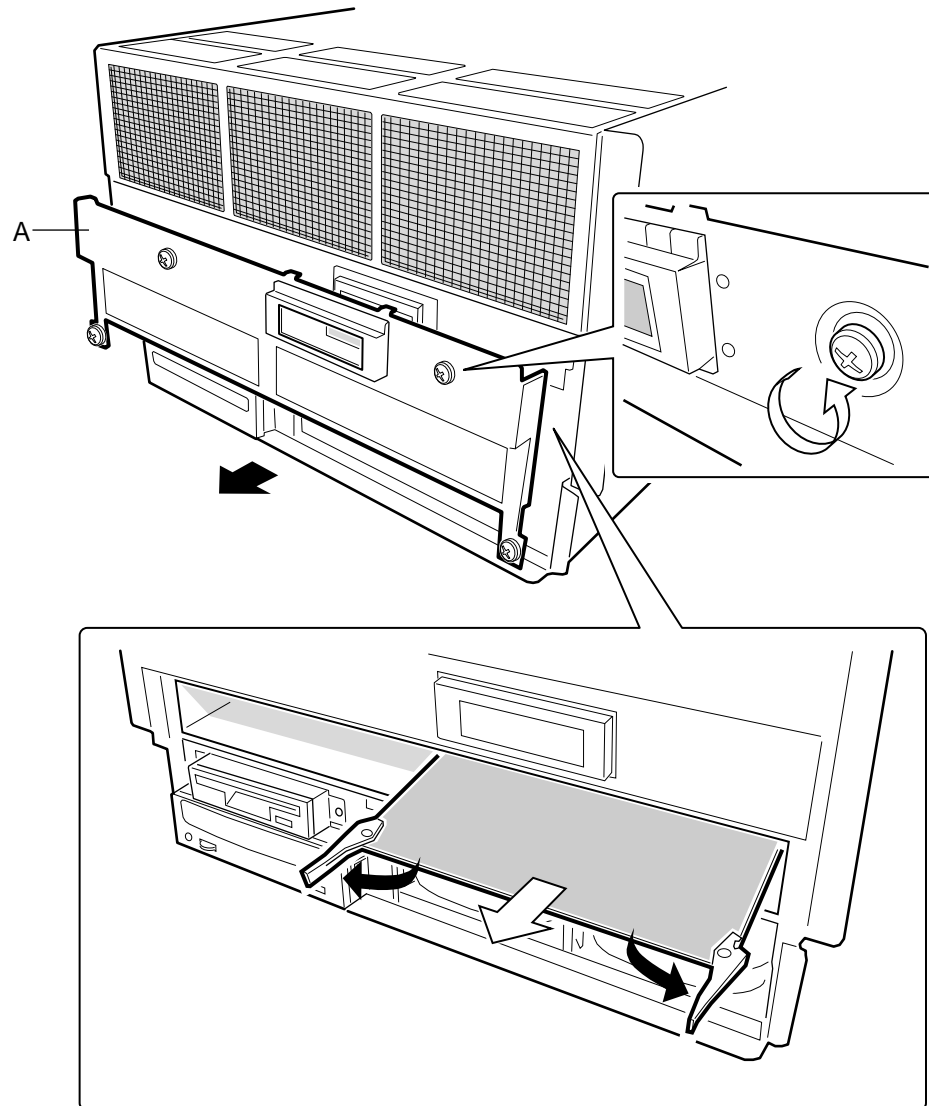
OM10703

Figure 48. Removing a Memory Module

A.   Memory Module Cover

Removing DIMMs

⚠ **CAUTION**

>Use extreme care when removing a DIMM. Too much pressure can damage
>the socket slot. Apply only enough pressure on the plastic ejector levers to
>release the DIMM.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove each memory module and place it component-side up on a nonconductive, static-free surface (see "Removing a Memory Module" on page 142).
3. Gently push the plastic ejector levers out and down to eject a DIMM from its socket.
4. Hold the DIMM only by its edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket and store it in an antistatic package.
5. Repeat to remove other DIMMs as necessary.

    If you are REPLACING DIMMs, proceed to "Installing DIMMs" on page 145.

    If you are simply REMOVING DIMMs, continue the procedure with the following steps.
6. Reinstall the memory module.
7. Run the SSU/BIOS Setup to configure the system and to properly set up advanced memory attributes as required.

Installing DIMMs

⚠ **CAUTIONS**

Use extreme care when installing a DIMM. Applying too much pressure can damage the socket. DIMMs are keyed and can be inserted in only one way.

Mixing dissimilar metals might cause memory failures later, resulting in data corruption. Install DIMMs with gold-plated edge connectors only in gold-plated sockets.

⇒ **NOTE**

DIMM slots on the memory module must be installed only in certain configurations. See "Memory Overview" on page 25 and Figure 49 on page 145 for requirements.
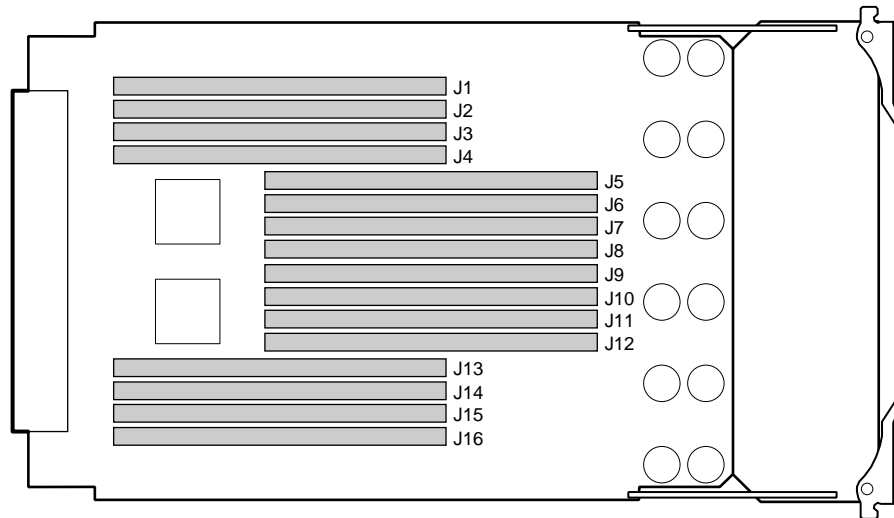
OM10690

Figure 49. DIMMs Slot Layout

See Figure 50.

1. Holding the DIMM only by its edges, remove it from its antistatic package.
2. Orient the DIMM so that the two notches in the bottom edge of the DIMM align with the keyed socket on the memory module.
3. Insert the bottom edge of the DIMM into the socket, then press down firmly on the DIMM until it seats correctly.
4. Gently push the plastic ejector levers on the socket ends to the upright position.
5. Repeat the steps to install each DIMM.
6. Reinstall the memory module.
7. Run the SSU to configure the system and to properly attribute ECC memory.
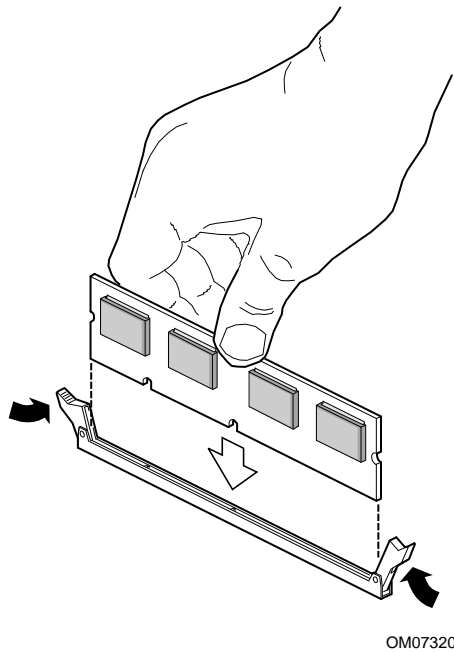
OM07320

Figure 50. Installing DIMMs

Processors: Removing and Installing

The profusion carrier supports two processor mezzanine boards. Each mezzanine board provides four Slot 2 connectors for Pentium III Xeon processors packaged in S.E.C. cartridges.

Unpopulated Slot 2 connectors require front side bus (FSB) termination boards. When removing and installing processors, read the sections "Front Side Bus (FSB) Termination Board Assembly" on page 150.

⚠ **CAUTION**

> The processors can be extremely sensitive to ESD and always require careful handling. After removing a processor from a protective wrapper or from a mezzanine board, place it on a nonconductive, static-free surface. Do not slide the processor over any surface.

Removing a Processor

See Figure 51 (page 148) and Figure 52 (page 149).

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the top cover (see "Removing the Top Cover" on page 98).
3. Remove the processor holddown and set it aside.
4. Simultaneously rotate the eject/insert levers of the processor cartridge outward to eject the cartridge out of the Slot 2 connector on the mezzanine board.
5. Slide the cartridge out of the processor retention bracket slot guides, and place it heat sink-side up on a nonconductive, static-free surface, or store it in an antistatic protective wrapper.

⚠ **CAUTION**

If a Slot 2 connector is depopulated, a termination module must be installed in the connector to properly terminate the signals on the FSB. See "Front Side Bus (FSB) Termination Board Assembly" on page 150.
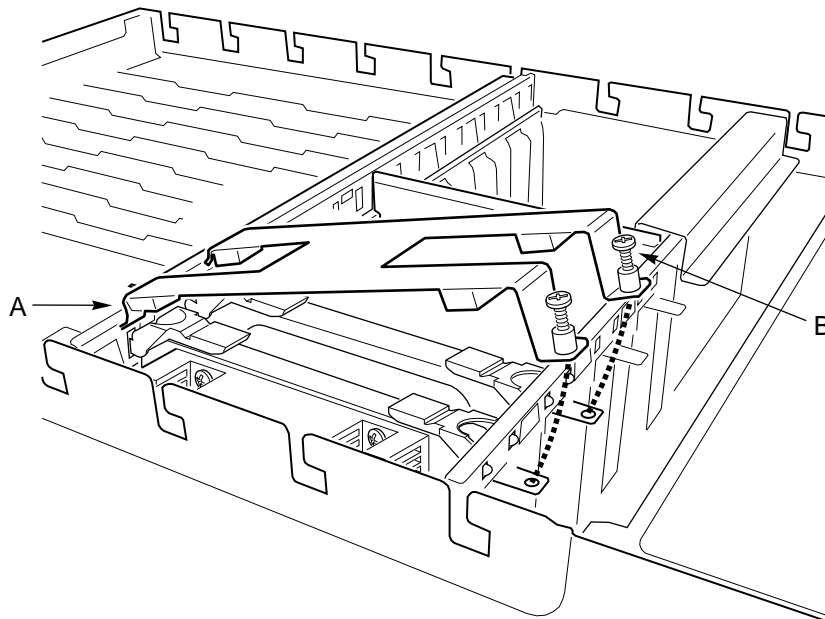
OM10695

Figure 51. Removing a Processor Holddown

A. Processor holddown hook end
B. Captive screw

Installing a Processor

See Figure 51 (page 148) and Figure 52 (page 149).

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. To access the processor mezzanine board(s), follow the steps in "Removing a Processor" on page 148.
3. Being careful not to touch the gold edge connector on the processor cartridge, remove it from the protective wrapper. Place the cartridge with the heatsink-side up on a nonconductive, static-free surface.
4. Record the serial number of the cartridge in your equipment log (page 197).
5. Install processors sequentially beginning with the connector marked Processor 1 on the mezzanine board.
6. Grasp the cartridge by the eject/insert levers, (A) and carefully slide it into the slot guides of the processor retention bracket until the processor stops.
7. To seat the cartridge in the mezzanine board connector, push down on the levers simultaneously, making sure that the lever locks (B) engage with the slots of the processor retention bracket flange (C).
8. Insert the hook end of the holddown bracket in the flange of the processor retention bracket.
9. Reinstall the holddown securing screw.
10. Reinstall the top cover.
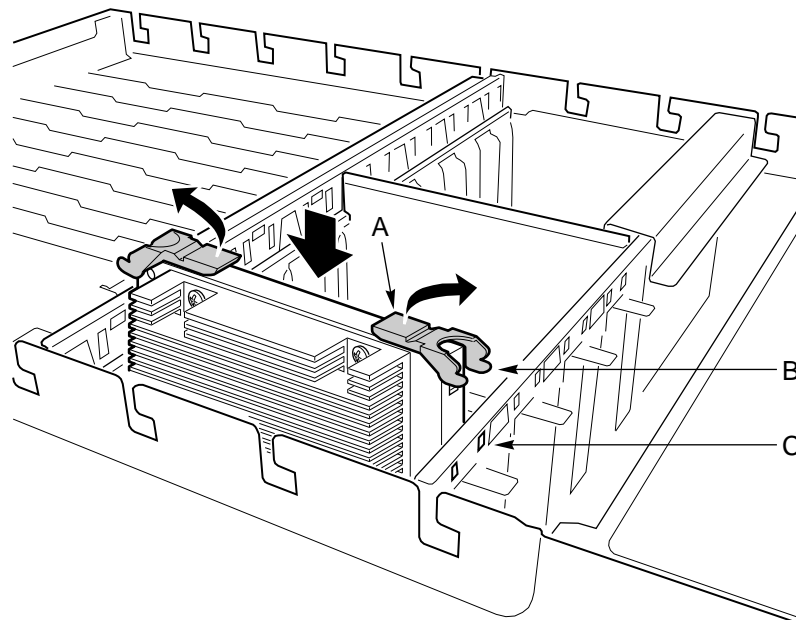
OM10693

Figure 52. Installing a Processor

A. Eject/insert levers
B. Lever locks
C. Slot in processor retention bracket flange

Front Side Bus (FSB) Termination Board Assembly

The profusion carrier provides connectors for two processor mezzanine boards. Each board provides four Slot 2 connectors for Pentium lll Xeon processors packaged in S.E.C. cartridges. If any Slot 2 connector is depopulated, a termination board assembly must be installed in the connector to properly terminate the signals on the FSB.

For example, if only two slots in a mezzanine board are populated with processors, you need FSB termination board assemblies in the two unpopulated processor slots.
The assembly is a termination board packaged in plastic housing.

Removing a Termination Board

See Figure 53.

1. Observe the safety precautions, warnings, and cautions at the beginning of this chapter.
2. Remove the top cover (see "Removing the Top Cover" on page 98).
3. Remove the processor holddown bracket and set it aside.
4. Simultaneously rotate the eject/insert levers of the terminator module outward to eject the module out of the Slot 2 connector.
5. Slide the module out of the processor retention bracket slot guides, and place it component-side down on a nonconductive, static-free surface.

Installing a Termination Board

See Figure 53.

1. Grasp the terminator board by the eject/insert levers, (A) and carefully slide it into the slot guides of the processor retention bracket until the board stops.
2. To seat the board in the mezzanine board connector, push down on the levers simultaneously, making sure that the lever locks (B) engage with the slots of the processor retention bracket flange (C).
3. Insert the hook end of the holddown bracket in the flange of the processor retention bracket.
4. Insert the screws you removed earlier and tighten them firmly (8.0 inch-pounds).
5. Install the top cover.
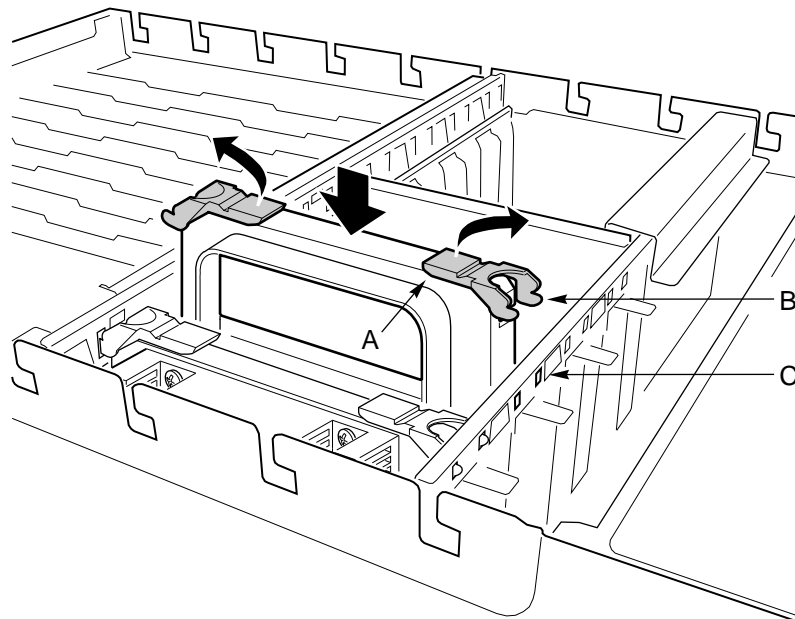
OM10694

Figure 53. Installing a Termination Board Assembly

A. Eject/insert levers
B. Lever locks
C. Slot in processor retention bracket flange

Replacing the Backup Battery

The lithium battery on the I/O carrier powers the real-time clock (RTC) for three to four years in the absence of power. When the battery weakens, it loses voltage and the system settings stored in CMOS RAM in the RTC (e.g., the date and time) can be wrong. Contact your customer service representative or dealer for a list of approved devices.

⚠ **WARNING**

> **If the system has been running, any installed processor and heat sink on the processor board(s) will be hot. To avoid the possibility of a burn, be careful when removing or installing components that are located near processors.**

The following warning and translations are required by specific certifying agencies to be printed immediately adjacent to the procedure for removing the RTC.

⚠ **WARNING**

> **Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.**

⚠ **ADVARSEL**!

> **Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.**

⚠ **ADVARSEL**

> **Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.**

⚠ **VARNING**

> **Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.**

⚠ **VAROITUS**

> **Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.**
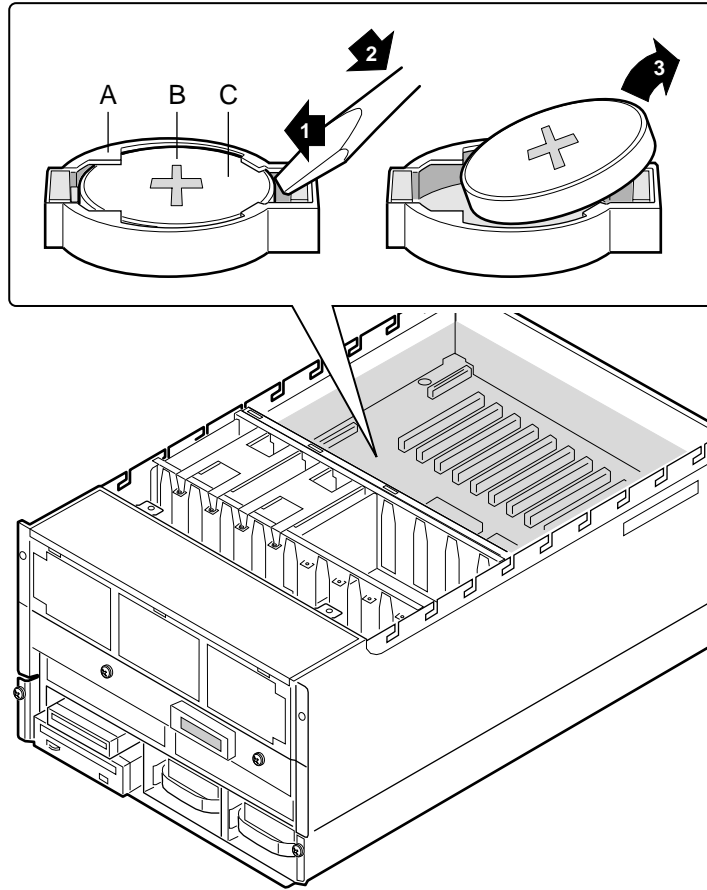
OM11018

Figure 54. Replacing the Lithium Battery

    A.   Tab
    B.   Positive-side up
    C.   Battery

1. Observe the safety and ESD precautions at the beginning of this chapter and the additional warning given on page 152.
2. Remove the top cover.
3. Insert the tip of a small flat-bladed screwdriver or equivalent under the plastic tab on the snap-on plastic retainer (1).
4. Gently push down on the screwdriver to lift the battery (2).
5. Remove the battery from its socket (3).
6. Dispose of the battery according to local ordinance.
7. Remove the new lithium battery from its package and, being careful to observe the correct polarity, insert it in the battery socket.
8. Reinstall the top cover using the original screws.
9. Run the SSU to restore the configuration settings to the RTC.

7 Solving Problems

This chapter helps you identify and solve problems that might occur while you are using the system.

Resetting the System

To do this:	Press:
Soft boot reset, which clears system memory and reloads the operating system.	<Ctrl+Alt+Del>
Clear system memory, restart POST, and reload the operating system.	Reset button
Cold boot reset, which clears system memory, restarts POST, reloads the operating system, and halts power to all peripherals.	Power off/on

Initial System Startup

Problems that occur at initial system startup are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause.

Checklist

- Are all cables and boards correctly connected and secured?
- Are the processors and termination boards fully seated in their slots on the mezzanine board(s)?
- Is at least one memory board installed and fully seated?
- Are all add-in PCI boards fully seated in their slots on the I/O carrier?
- Are all switch and jumper settings on boards and drives correct?
- Are all switch and jumper settings on add-in boards and peripheral devices correct? To check these settings, refer to the manufacturer's documentation that comes with them. If applicable, ensure that there are no conflicts—for example, two add-in boards sharing the same interrupt.
- Are all DIMMs installed correctly?
- Are all peripheral devices installed correctly?
- Is the hard disk drive properly formatted or configured?
- Are all device drivers properly installed?
- Are the configuration settings made with the SSU correct?
- Is the OS properly loaded? Refer to the OS documentation.
- Did you press the system power on/off switch on the front panel to turn the server on (power-on light should be lit)?
- Are the system power cords properly connected to the system and plugged into a NEMA 6-15R outlet for 200-240 V~?
- Is AC power available at the wall outlet?
- If these items are correct but the problem recurs, see "More Problem-Solving Procedures" on page 157.

Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly.

Checklist

- Does the system meet the minimum hardware requirements for the software? See the software documentation.
- Is the software an authorized copy? If not, get one; unauthorized copies often do not work.
- If you are running the software from a diskette, is it a good copy?
- If you are running the software from a CD-ROM disk, is the disk scratched or dirty?
- If you are running the software from a hard disk drive, is the software correctly installed? Were all necessary procedures followed and files installed?
- Are the correct device drivers installed?
- Is the software correctly configured for the system?
- Are you using the software correctly?
- If the problems persist, contact the software vendor's customer service representative.

After the System Has Been Running Correctly

Problems that occur after the system hardware and software have been running correctly often indicate equipment failure. Many situations that are easy to correct, however, can also cause such problems; sometimes the problem stems from changes made to the system, such as hardware or software that has been added or removed.

Checklist

- If you are running the software from a diskette, try a new copy of the software.
- If you are running the software from a CD-ROM disk, try a different disk to see if the problem occurs on all disks.
- If you are running the software from a hard disk drive, try running it from a diskette. If the software runs correctly, there might be a problem with the copy on the hard disk drive. Reinstall the software on the hard disk, and try running it again. Make sure all necessary files are installed.
- If the problems are intermittent, there may be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- If you suspect that a transient voltage spike, power outage, or brownout might have occurred, reload the software and try running it again. (Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands.)

⟹ **NOTE**

Random errors in data files: If you are getting random errors in your data files, they may be getting corrupted by voltage spikes on your power line. If you are experiencing any of the above symptoms that might indicate voltage spikes on the power line, you might want to install a surge suppressor between the power outlet and the system power cords.

More Problem-Solving Procedures

This section provides a more detailed approach to identifying a problem and locating its source.

Preparing the System for Diagnostic Testing

⚠ **CAUTION**

> **Turn off devices before disconnecting cables:** Before disconnecting any peripheral cables from the system, turn off the system and any external peripheral devices. Failure to do so can cause permanent damage to the system and/or the peripheral devices.

1. Turn off the system and all external peripheral devices. Disconnect all of them from the system, except the keyboard and video monitor.
2. Make sure the system power cords are plugged into a properly grounded AC outlet.
3. Make sure your video display monitor and keyboard are correctly connected to the system. Turn on the video monitor. Set its brightness and contrast controls to at least two-thirds of their maximum ranges (see the documentation supplied with your video display monitor).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in drive A. Otherwise, place a diskette containing the operating system files in drive A.
5. Turn on the system. If the power LED does not light, see "Power Light Does Not Light" on page 159.

Using PCDiagnostics

A diagnostics package for the system is contained on the configuration software CD-ROM that comes with the system. For documentation about the test modules, see the Diagnostic help disks that end with the extension .HLP. They are ASCII files that you can print to form a manual of all tests in this product.

- The program called Testview uses a simple DOS-based menu system.
- The program called T.EXE is a noninteractive test executable used to run test program modules from DOS batch files.
- The README.TXT file for diagnostics tells how to install the program.

⚠ **CAUTION**

> **Read help information for a test before running it:** the diagnostic package contains many optional tests that should be used only by a user with advanced technical knowledge. Inadvertent actions could be damaging, such as running a hard drive write test on a hard disk. All tests that require external hardware, user interaction, or are destructive, are disabled in the default configurations. Before using such a test, make sure you read and understand the help information for that test.

Monitoring POST

See Chapter 3, "Configuration Software and Utilities," beginning on page 33.

Verifying Proper Operation of Key System Lights

As POST determines the system configuration, it tests for the presence of each mass-storage device installed in the system. As each device is checked, its activity light should turn on briefly. Check for the following:

- Does the diskette drive activity light turn on briefly? If not, see "Diskette Drive Activity Light Does Not Light" on page 160.
- If a second diskette drive is installed, does its activity light turn on briefly? If not, see "Diskette Drive Activity Light Does Not Light" on page 160.
- If there is a hard disk drive or SCSI device installed in the system, does the hard disk drive activity light on the control panel turn on briefly? If not, see "Hard Disk Drive Activity Light Does Not Light" on page 161.

Confirming Loading of the Operating System

Once the system boots up, the operating system prompt appears on the screen. The prompt varies according to the operating system. If the operating system prompt does not appear, see "Initial System Startup" on page 155.

Specific Problems and Corrective Actions

This section provides possible solutions for these specific problems:

- Power light does not light.
- No beep or incorrect beep pattern.
- No characters appear on screen.
- Characters on the screen appear distorted or incorrect.
- System cooling fans do not rotate.
- Diskette drive activity light does not light.
- Hard disk drive activity light does not light.
- CD-ROM drive activity light does not light.
- Problems with application software.
- The startup prompt "Press <F2> key if you want to run Setup" does not appear on the screen.
- The bootable CD-ROM is not detected.

Try the solutions in the order given. If you cannot correct the problem, contact your service representative or authorized dealer for assistance.

Power Light Does Not Light

Check the following:

- Are all the power supplies plugged in? Is the power turned on to the outlet? Is there a blown fuse or breaker?
- Is the system connected to a 208 VAC source?
- Is the system operating normally? If so, the power LED is probably defective or the cable from the front panel to the I/O carrier is loose.
- Are there other problems with the system? If so, check the items listed under "System Cooling Fans Do Not Rotate Properly" on page 160.
- If all items are correct and problems persist, contact your service representative or authorized dealer for assistance.

No Beep Codes

If the system operates normally, but there was no beep, the speaker might be defective. If the speaker is enabled, but the speaker does not function, contact your service representative or authorized dealer for assistance.

Record the beep code emitted by POST, and see "Error and Informational Messages" on page 162.

No Characters Appear on Screen

Check the following:

- Is the keyboard working? Check to see that the "Num Lock" light is functioning.
- Is the video monitor plugged in and turned on? Many modern video monitors shut down when inactive and may require a moment to warm up when activated.
- Are the brightness and contrast controls on the video monitor properly adjusted?
- Are the video monitor switch settings correct?
- Is the video monitor signal cable properly installed?
- Is the onboard video controller enabled?
- If you are using an add-in video controller board, do the following:
1. Verify that the video controller board is fully seated in the I/O carrier connector (and verify that the video monitor is plugged in to the ACTIVE video controller).
2. Reboot the system for changes to take effect.
3. If there are still no characters on the screen after rebooting the system and POST emits a beep code, write down the beep code you hear. This information is useful for your service representative. See "POST Codes and Countdown Codes" on page 163.
4. If you do not receive a beep code and characters do not appear, the video display monitor or video controller may have failed. You can verify this by trying the monitor on another system or trying a different monitor on this system. Contact your service representative or authorized dealer for assistance.

Characters Are Distorted or Incorrect

Check the following:

- Are the brightness and contrast controls properly adjusted on the video monitor? See the manufacturer's documentation.
- Are the video monitor signal and power cables properly installed?
- Is the correct monitor/video board installed for your operating system?
- If the problem persists, the video monitor may be faulty or it may be the incorrect type. Contact your service representative or authorized dealer for assistance.

System Cooling Fans Do Not Rotate Properly

If the system cooling fans are not operating properly, system components could be damaged.

Check the following:

- Is AC power available at the wall outlet?
- Are the system power cords properly connected to the system and the wall outlet?
- Did you press the power on/off push-button switch?
- Is the power-on light lit?
- Have any of the fan motors stopped (use the server management subsystem to check the fan status)?
- Are the fan power connectors properly connected to the front panel?
- Are there any shorted/open wires caused by pinched cables or power connector plugs forced incorrectly into sockets?
- If the switches and connections are correct and AC power is available at the wall outlet, contact your service representative or authorized dealer for assistance.

Diskette Drive Activity Light Does Not Light

Check the following:

- Are the diskette drive power and signal cables properly installed?
- Are all relevant switches and jumpers on the diskette drive set correctly?
- Is the diskette drive properly configured?
- Is the diskette drive activity light always on? If so, the signal cable may be plugged in incorrectly.
- If you are using the onboard diskette controller, use the SSU to make sure that "Onboard Floppy" is set to "Enabled. " If you are using an add-in diskette controller, make sure that "Onboard Floppy" is set to "Disabled." To run the SSU, see Chapter 3, starting on page 33.
- If the problem persists, there may be a problem with the diskette drive, I/O carrier, or drive signal cable. Contact your service representative or authorized dealer for assistance.

Hard Disk Drive Activity Light Does Not Light

If you have installed one or more hard disk drives in your system, check the following:

- Are the power and signal cables to the drive properly installed?
- Are all relevant switches and jumpers on the hard drive and adapter board set correctly?
- Is the onboard IDE controller enabled? (IDE hard drives only)?
- Is the hard disk drive properly configured?

⇒ **NOTE**

> **Front panel hard disk LED indicates IDE and SCSI devices:** The hard disk drive activity light on the front panel lights when either an IDE hard disk drive, or a SCSI device controlled by the onboard SCSI host controller, is in use. This LED does not display CD-ROM activity.

CD-ROM Drive Activity Light Does Not Light

Check the following:

- Are the power and signal cables to the CD-ROM drive properly installed?
- Are all relevant switches and jumpers on the drive set correctly?
- Is the drive properly configured?
- Is the onboard IDE controller enabled?

⇒ **NOTE**

> **Front panel hard disk LED indicates IDE and SCSI devices:** The hard disk drive activity light on the front panel lights when either an IDE hard disk drive, or a SCSI device controlled by the onboard SCSI host controller, is in use. This LED does not display CD-ROM activity.

Network Problems

If you have network problems, consult the documentation that came with the network board you purchased for this server.

PCI Installation Tips

Some common PCI tips are listed here.

- Certain drivers may require interrupts that are not shared with other PCI drivers. The SSU can be used to adjust the interrupt numbers for PCI devices. For certain drivers, it may be necessary to alter settings so that interrupts are not shared.
- Check PCI interrupt interdependencies among slots and onboard devices.

Problems with Application Software

If you have problems with application software, do the following:

- Verify that the software is properly configured for the system. See the software installation and operation documentation for instructions on setting up and using the software.
- Try a different copy of the software to see if the problem is with the copy you are using.
- Make sure all cables are installed correctly.
- Verify that the I/O carrier switches are set correctly. See "Configuration Switches" on page 182.
- If other software runs correctly on the system, contact your vendor about the failing software.
- If the problem persists, contact the software vendor's customer service representative for assistance.

Bootable CD-ROM Is Not Detected

Check the following:

- Is BIOS set to allow the CD-ROM to be the first bootable device?
- Is the peripheral bay fully seated against the chassis?

Error and Informational Messages

When you turn on the system, POST displays messages that provide information about the system. If a failure occurs, POST emits beep codes that indicate errors in hardware, software, or firmware. If POST can display a message on the video display screen, it causes the speaker to beep twice as the message appears.

POST Codes and Countdown Codes

BIOS indicates the current testing phase during POST after the video adapter has been successfully initialized by outputting a 2-digit hex code to I/O location 80h. To view POST codes, you must install an optional PCI POST add-in board. For more information, contact your customer-service representative.

Table 16.   Port-80 Codes

POST Code	Beeps	Error
02		Verify Real Mode
03		Disable NMI
04		Get Processor type
06		Initialize system hardware
08		Initialize chip set registers with initial POST values
09		Set in POST flag
0A		Initialize processor registers
0B		Enable processor cache
0C		Initialize caches to initial POST values
0E		Initialize I/O
0F		Initialize the local bus IDE
10		Initialize Power Management
11		Load alternate registers with initial POST values new
12		Restore processor control word during warm boot
13		Reset PCI bus masters
14		Initialize keyboard controller
16	1-2-2-3	BIOS ROM checksum
17		Prepare to size RAM
18		8254 timer initialization
1A		8237 DMA controller initialization
1C		Reset Programmable Interrupt Controller
20	1-3-1-1	Test DRAM refresh
22	1-3-1-3	Test 8742 Keyboard Controller
24		Set ES segment register to 4 GB
28	1-3-3-1	Autosize DRAM
29	1-3-3-2	Initialize or call POST Memory Manager
2A		Clear 512 KB base RAM
2C	1-3-4-1	RAM failure on address line xxxx
2E	1-3-4-3	RAM failure on data bits xxxx of low byte of memory bus
2F		Prepare to shadow system BIOS
30	1-4-1-1	RAM failure on data bits xxxx of high byte of memory bus
32		Test processor bus-clock frequency
33		Initialize the POST Dispatch Manager
34	1-4-2-1	Test CMOS

Table 16.   Port-80 Codes (continued)

POST Code	Beeps	Error
35		RAMInitialize alternate chip set registers
36		Warm start shut down
37		Reinitialize the chip set (MB only)
38		Shadow system BIOS ROM
39		Reinitialize the cache (MB only)
3A		Autosize cache
3C		Configure advanced chip set registers
3D		Load alternate registers with CMOS values new
40		Set Initial processor speed new
42		Initialize interrupt vectors
44		Initialize BIOS interrupts
45		Initialize run-time devices
46		Check ROM copyright notice
47		Initialize manager for PCI Option ROMs
48		Check video configuration against CMOS
49		Initialize PCI bus and devices
4A		Initialize all video adapters in system
4B		Display QuietBoot screen
4C		Shadow video BIOS ROM
4E		Display copyright notice
50		Display processor type and speed
52		Test keyboard
54		Set key click if enabled
56		Enable keyboard
58	2-2-3-1	Test for unexpected interrupts
59		Initialize POST Display Service
5A		Display prompt "Press F2 to enter SETUP"
5B		Disable cache
5C		Test RAM between 512 and 640k
60		Test extended memory
62		Test extended memory address lines
64		Jump to UserPatch1
66		Configure advanced cache registers
67		Initialize processors
68		Enable external and processor caches
69		Setup power management
6A		Display external cache size

Table 16.   Port-80 Codes (continued)

POST Code	Beeps	Error
6B		Load custom defaults
6C		Display shadow message
6E		Display nondisposable segments
70		Display error messages
72		Check for configuration errors
74		Test real-time clock
76		Check for keyboard errors
7A		Test for key lock on
7C		Set up hardware interrupt vectors
7E		Test coprocessor if present
80		Detect and install external RS232 ports
81		Initialize run-time devices
82		Detect and install external parallel ports
83		Configure IDE controller
84		Initialize parallel port
85		Initialize PC-compatible PnP ISA devices
86		Re-initialize embedded I/O ports
87		Initialize embedded configurable devices
88		Initialize BIOS Data Area
89		Enable NMI
8A		Initialize Extended BIOS Data Area
8B		Initialize mouse
8C		Initialize floppy controller
8F		Preinitialize local-bus hard-disk controller
90	3-2-1-1	Initialize hard-disk controller or failure during MultiBoot Allocation
91		Initialize local-bus hard-disk controller
92		Jump to UserPatch2
93		Build MPTABLE
94		Disable A20 address line
95		Install CD-ROM for boot
96		Clear huge ES segment register
97		Fixup MPTABLE
98	1-2	Search for option ROMs. One long and two short beeps on checksum failure
9A		Shadow option ROMs
9C		Set up Power Management
9D		Initialize security
9E		Enable hardware interrupts

Table 16. Port-80 Codes (continued)

POST Code	Beeps	Error
9F		Initialize local-bus hard-disk controller
A0		Set time of day
A2		Check key lock
A4		Initialize typematic rate
A8		Erase F2 prompt
AA		Scan for F2 key stroke
AC		Enter SETUP
AE		Clear in-POST flag
B0		Check for errors
B2		POST done – prepare to boot operating system
B4	1	One short beep before boot
B5		Display MultiBoot menu
B6		Check password (optional)
B7		Initialize ACPI
B8		Clear global descriptor table
B9		Prepare to boot
BA		Initialize DMI
BC		Clear parity checkers
BD		Invoke boot menu
BE		Clear screen (optional)
BF		Check virus and backup reminders
C0	4-1-1-1	Try to boot with INT 19 (Beep code if disabling A20 fails)
C1		Initialize the POST Error Manager
C2		Log POST Errors
C3		Display POST Errors
D0		Interrupt handler error
D2		Unknown interrupt error
D4		Pending interrupt error
D6		Initialize option ROM error
D8		Shutdown error
DA		Extended Block Move
DC		Shutdown 10 error
DE		Keyboard controller error
DF	4-2-4-4	A20 Error
FB		FRB in progress
FC		Five second wait for BMC to initialize
FD		FRB-2 watch dog timer failed; reset will occur in five seconds

POST Error Codes and Messages

The following error codes and messages are representative of various conditions BIOS identifies. The exact strings and error numbers may be different from those listed here.

Table 17.   POST Error Codes and Messages

Code	Error message
0200	Failure Fixed Disk
0210	Stuck Key
0211	Keyboard error
0213	Keyboard locked - Unlock key switch
0220	Monitor type does not match CMOS - Run SETUP
0230	System RAM Failed at offset
0231	Shadow RAM Failed at offset
0232	Extended RAM Failed at offset
0250	System battery is dead - Replace and run SETUP
0251	System CMOS checksum bad - Default configuration used
0260	System timer error
0270	Real-time clock error
0280	Previous boot incomplete - default configuration used
0281	Memory size found by POST differed from EISA CMOS
0297	Extended memory error
02B0	Diskette drive A error
02B1	Diskette drive B error
02B2	Incorrect Drive A type - run SETUP
02B3	Incorrect Drive B type - run SETUP
02D0	System cache error - Cache disabled
02F0	CPU ID
02F4	EISA CMOS not writeable
02F5	DMA Test Failed
02F6	Software NMI Failed
02F7	Fail-safe timer NMI failed
8108	Watchdog Timer failed on last boot
8110	Server Management Interface filed to function
814B	BMC in Update Mode
8150	NVRAM Cleared By Jumper
8152	ESCD Data Cleared
8153	Password Cleared By Jumper
8160	Unable to apply BIOS Update for Board 2 Processor 1

Table 17. POST Error Codes and Messages (continued)

Code	Error message
8161	Unable to apply BIOS Update for Board 2 Processor 2
8162	Unable to apply BIOS Update for Board 2 Processor 3
8163	Unable to apply BIOS Update for Board 2 Processor 4
8164	Unable to apply BIOS Update for Board 1 Processor 1
8165	Unable to apply BIOS Update for Board 1 Processor 2
8166	Unable to apply BIOS Update for Board 1 Processor 3
8167	Unable to apply BIOS Update for Board 1 Processor 4
8168	Board 2 Processor 1 L2 cache failed
8169	Board 2 Processor 2 L2 cache failed
816A	Board 2 Processor 3 L2 cache failed
816B	Board 2 Processor 4 L2 cache failed
816C	Board 1 Processor 1 L2 cache failed
816D	Board 1 Processor 2 L2 cache failed
816E	Board 1 Processor 3 L2 cache failed
816F	Board 1 Processor 4 L2 cache failed
8170	BIOS does not support current stepping for Board 2 Processor 1
8171	BIOS does not support current stepping for Board 2 Processor 2
8172	BIOS does not support current stepping for Board 2 Processor 3
8173	BIOS does not support current stepping for Board 2 Processor 4
8174	BIOS does not support current stepping for Board 1 Processor 1
8175	BIOS does not support current stepping for Board 1 Processor 2
8176	BIOS does not support current stepping for Board 1 Processor 3
8177	BIOS does not support current stepping for Board 1 Processor 4
8180	PXB 1 Failed to respond
8181	Mismatch among Processors Detected
8182	L2 cache size mismatch
8200	Baseboard management controller failed to function
8201	Front panel controller failed to function
8202	Power Share Controller failed to function
8203	Hotswap Controller failed to function
8210	Board 2 Processor 1 failed BIST
8211	Board 2 Processor 2 failed BIST
8212	Board 2 Processor 3 failed BIST
8213	Board 2 Processor 4 failed BIST
8214	Board 1 Processor 1 failed BIST
8215	Board 1 Processor 2 failed BIST
8216	Board 1 Processor 3 failed BIST
8217	Board 1 Processor 4 failed BIST
8220	Board 2 Processor 1 Internal Error (IERR) failure
8221	Board 2 Processor 2 Internal Error (IERR) failure

Solving Problems

Table 17.   POST Error Codes and Messages (continued)

Code	Error message
8222	Board 2 Processor 3 Internal Error (IERR) failure
8223	Board 2 Processor 4 Internal Error (IERR) failure
8224	Board 1 Processor 1 Internal Error (IERR) failure
8225	Board 1 Processor 2 Internal Error (IERR) failure
8226	Board 1 Processor 3 Internal Error (IERR) failure
8227	Board 1 Processor 4 Internal Error (IERR) failure
8230	Board 2 Processor 1 Thermal Trip failure
8231	Board 2 Processor 2 Thermal Trip failure
8232	Board 2 Processor 3 Thermal Trip failure
8233	Board 2 Processor 4 Thermal Trip failure
8234	Board 1 Processor 1 Thermal Trip failure
8235	Board 1 Processor 2 Thermal Trip failure
8236	Board 1 Processor 3 Thermal Trip failure
8237	Board 1 Processor 4 Thermal Trip failure
8240	Board 2 Processor 1 disabled
8241	Board 2 Processor 2 disabled
8242	Board 2 Processor 3 disabled
8243	Board 2 Processor 4 disabled
8244	Board 1 Processor 1 disabled
8245	Board 1 Processor 2 disabled
8246	Board 1 Processor 3 disabled
8247	Board 1 Processor 4 disabled
8250	Board 2 Processor 1 failed FRB Level 3 timer
8251	Board 2 Processor 2 failed FRB Level 3 timer
8252	Board 2 Processor 3 failed FRB Level 3 timer
8253	Board 2 Processor 4 failed FRB Level 3 timer
8254	Board 1 Processor 1 failed FRB Level 3 timer
8255	Board 1 Processor 2 failed FRB Level 3 timer
8256	Board 1 Processor 3 failed FRB Level 3 timer
8257	Board 1 Processor 4 failed FRB Level 3 timer
8260	Board 2 Processor 1 failed initialization
8261	Board 2 Processor 2 failed initialization
8262	Board 2 Processor 3 failed initialization
8263	Board 2 Processor 4 failed initialization
8264	Board 1 Processor 1 failed initialization
8265	Board 1 Processor 2 failed initialization
8266	Board 1 Processor 3 failed initialization
8267	Board 1 Processor 4 failed initialization
8270	Memory Module 1 failed
8270	Memory Module 2 failed
8280	Coherency Filter failed left data test
8281	Coherency Filter failed right data test
8290	Coherency Filter failed left address test
8291	Coherency Filter failed right address test

8 Technical Reference

This section includes:

- Connector pinouts and boardset locations
- Information on jumpers
- System I/O addresses
- System memory map addresses
- Interrupts
- Video modes

Connectors
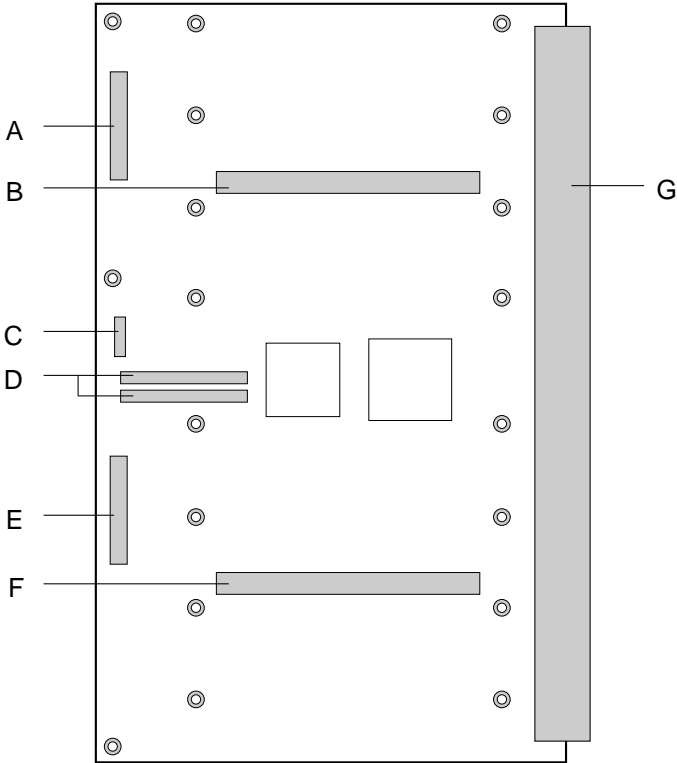
OM10941

Figure 55. Profusion Carrier Layout

A. Front panel connector
B. Connector for processor mezzanine board (primary)
C. Board configuration jumper block
D. Tag DIMM sockets
E. System JTAG connector
F. Connector for processor mezzanine board (secondary)
G. Grand connector (connects to midplane)
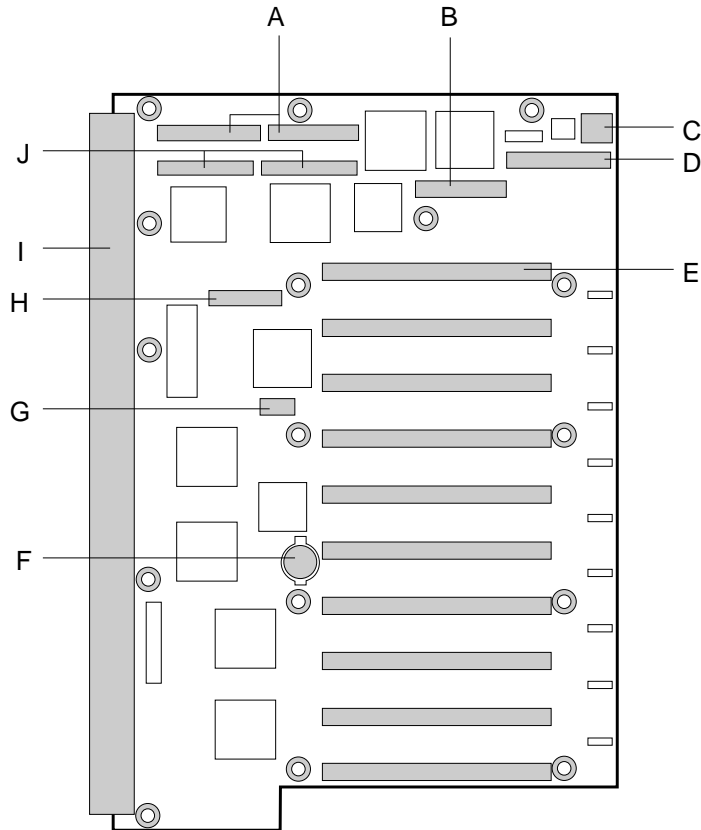
OM10940

Figure 56. I/O Carrier Layout

A. IDE and diskette connectors
B. PHP LED/switch connector
C. USB connector
D. I/O riser board connector
E. PCI add-in board slots (ten)
F. Lithium battery
G. Configuration switch SW4G1
H. Server management feature connector (SFC)
I. Grand connector (connects to midplane)
J. SCSI A and B connectors

Diskette Drive

OM08030
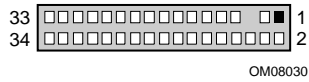
Table 18.   Diskette Drive Connector Pinout

Pin	Signal	Pin	Signal
1	GND	18	FD_DIR_L
2	FD_DENSEL	19	GND
3	GND	20	FD_STEP_L
4	N/C	21	GND
5	Key	22	FD_WDATA_L
6	FD_DRATE0	23	GND
7	GND	24	FD_WGATE_L
8	FD_INDEX_L	25	GND
9	GND	26	FD_TRK0_L
10	FD_MTR0_L	27	FD_MSEN0
11	GND	28	FD_WPROT_L
12	FD_DR1_L	29	GND
13	GND	30	FD_RDATA_L
14	FD_DR0_L	31	GND
15	GND	32	FD_HDSEL_L
16	FD_MTR1_L	33	GND
17	FD_MSEN1	34	FD_DSKCHG_L

IRMC Connector

OM08032
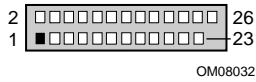
Table 19.   Intel Remote Management Card

Pin	Signal	Description
1	SMI_L	System Management Interrupt
2	I2C_BACKUP_SCL	
3	GND	Ground
4	Reserved	N/A
5	PWR_CNTRL_SFC_L	Host power supply on/off control
6	I2C_BACKUP_SDA	
7	VCC_STDBY	
8	KEYLOCK_FROM_SFC_L	Keyboard lock signal
9	NMI_5V	Nonmaskable interrupt indication
10	VCC3	3.3V power supply status input
11	RST_SFC_L	Baseboard reset signal from Server Monitor Module
12	GND	Ground
13	GND	Ground
14	Reserved	N/A
15	SECURE_MODE_BMC	Secure mode indication
16	GND	Ground
17	INSTRUSION_L	
18	SMM_NMI_L	
19	INIT_L	
20	GND	Ground
21	KB_DATA	
22	MS_DATA	
23	KB_CLK	
24	MS_CLK	
25	Key pin (N/C)	Connector key
26	RESET_BMC_OC_L	

VGA Video Port

5   1
10   6
15   11   OM04417
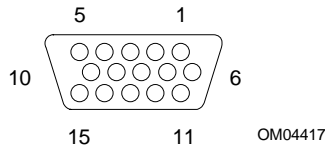
Table 20.   Video Port Connector Pinout

Pin	Signal	Pin	Signal
1	Red	9	N/C
2	Green	10	GND
3	Blue	11	NC
4	N/C	12	DDCDAT
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCCLK
8	GND		

Keyboard and Mouse

6   5
4   3
2   1   OM11313
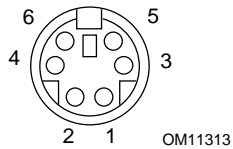
The PS/2-compatible connectors share a common housing; they are functionally equivalent.

Table 21.   Keyboard and Mouse Connector Pinouts

Pin	Keyboard signal	Pin	Mouse signal
1	KEYDAT	1	MSEDAT
2	NC	2	NC
3	GND	3	GND
4	FUSED_VCC (+5 V)	4	FUSED_VCC (+5 V)
5	KEYCLK	5	MSECLK
6	NC	6	NC

Parallel Port

```
  13                                    1
   ┌──────────────────────────────┐
   │ ○○○○○○○○○○○○○              │
   │  ○○○○○○○○○○○○               │
   └──────────────────────────────┘
  25                          14    OM11312
```
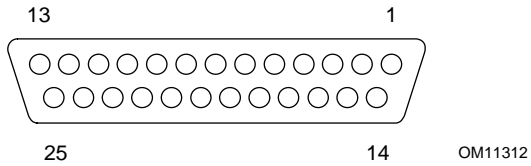
Table 22.   Parallel Port Connector Pinout

Pin	Signal	Pin	Signal
1	STROBE_L	10	ACK_L
2	Data bit 0	11	Busy
3	Data bit 1	12	PE
4	Data bit 2	13	SLCT
5	Data bit 3	14	AUFDXT_L
6	Data bit 4	15	ERROR_L
7	Data bit 5	16	INIT_L
8	Data bit 6	17	SLCTIN_L
9	Data bit 7	18–25	GND

Serial Ports A and B

```
   1        5
   ┌──────────┐
   │ ○○○○○   │
   │  ○○○○    │
   └──────────┘
   6        9   OM11311
```
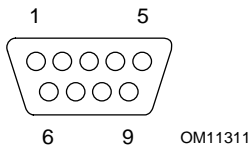
Table 23.   Serial Port Connector Pinout

Pin	Signal	Description
1	DCD	Data carrier detected
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RIA	Ring indication active

Universal Serial Bus (USB)

The SRPL8 server provides two external USB connectors at the back panel. Table 24 lists the pinout for each connector.

OM08036
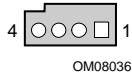
Table 24.   USB Connector Pinout

Pin	Signal	Notes
A1	VCC	Over current monitor line port 0
A2	DataL0	Differential data line paired with DATAH0
A3	DataH0	Differential data line paired with DATAL0
A4	GND	Cable ground
B1	VCC	Over current monitor line port 1
B2	DATAL1	Differential data line paired with DATAH1
B3	DATAH1	Differential data line paired with DATAI1
B4	GND	Cable ground

SCSI

OM08027
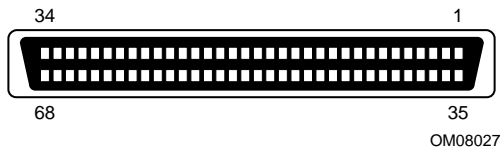
Table 25.   Wide SCSI Connector Pinout

Pin	Signal	Pin	Signal
1-16	GND	49-50	GND
17	TERMPWR	51	TERMPWR
18	TERMPWR	52	TERMPWR
19	Reserved	53	Reserved
20-34	GND	54	GND
35	DB12_L	55	ATN_L
36	DB13_L	56	GND
37	DB14_L	57	BSY_L
38	DB15_L	58	ACK_L
39	DBP1_L	59	RST_L
40	DB0_L	60	MSG_L
41	DB1_L	61	SEL_L
42	DB2_L	62	C/D_L
43	DB3_L	63	REQ_L
44	DB4_L	64	I/O_L
45	DB5_L	65	DB8_L
46	DB6_L	66	DB9_L
47	DB7_L	67	DB10_L
48	DBP _L	68	DB11_L

IDE

OM08029
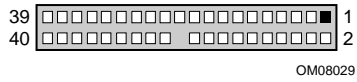
Table 26.   IDE Connector Pinout

Pin	Signal	Pin	Signal
1	RSTDRV	21	DRQ
2	GND	22	GND
3	DD7	23	DIOW
4	DD8	24	GND
5	DD6	25	DIOR
6	DD9	26	GND
7	DD5	27	IORDY
8	DD10	28	CSEL (1 KΩ p/d)
9	DD4	29	DACK
10	DD11	30	GND
11	DD3	31	IRQ
12	DD12	32	Reserved (N/C)
13	DD2	33	DA1
14	DD13	34	Reserved (N/C)
15	DD1	35	DA0
16	DD14	36	DA2
17	DD0	37	CS1P_L
18	DD15	38	DS3P_L
19	GND	39	DHACT_L
20	Keyed	40	GND

If no IDE drives are present, no IDE cable should be connected. If only one IDE drive is installed, it must be connected at the end of the cable.

PCI

Table 27. 33MHz, 64-bit PCI Connectors (Slots A and B)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST_L	A48	GND	B1	-12V	B48	AD10
A2	+12V	A49	AD9	B2	TCK	B49	M66EN
A3	TMS	A50	5V KEYWAY	B3	GND	B50	5V KEYWAY
A4	TDI	A51	5V KEYWAY	B4	TDO	B51	5V KEYWAY
A5	+5V	A52	C/BEO_L	B5	+5V	B52	AD8
A6	INTA_L	A53	+3.3V	B6	+5V	B53	AD7
A7	INTC_L	A54	AD6	B7	INTB_L	B54	+3.3V
A8	+5V	A55	AD4	B8	INTD_L	B55	AD5
A9	RESERVED	A56	GND	B9	PRSNT1_L	B56	AD3
A10	+5V	A57	AD2	B10	RESERVED	B57	GND
A11	RESERVED	A58	AD0	B11	PRSNT2_L	B58	AD1
A12	GND	A59	+5V	B12	GND	B59	+5V
A13	GND	A60	REQ64_L	B13	GND	B60	ACK64_L
A14	RESERVED	A61	+5V	B14	RESERVED	B61	+5V
A15	RESET_L	A62	+5V	B15	GND	B62	+5V
A16	+5V	A63	GND	B16	CLK	B63	RESERVED
A17	GRANT_L	A64	C/BE7_L	B17	GND	B64	GND
A18	GND	A65	C/BE5_L	B18	REQ_L	B65	C/BE6_L
A19	RESERVED	A66	+5V	B19	+5V	B66	C/BE4_L
A20	AD30	A67	PAR64	B20	AD31	B67	GND
A21	+3.3V	A68	AD62	B21	AD29	B68	AD63
A22	AD28	A69	GND	B22	GND	B69	AD61
A23	AD26	A70	AD60	B23	AD27	B70	+5V
A24	GND	A71	AD58	B24	AD25	B71	AD59
A25	AD24	A72	GND	B25	+3.3V	B72	AD57
A26	IDSEL	A73	AD56	B26	C/BE3_L	B73	GND
A27	+3.3V	A74	AD54	B27	AD23	B74	AD55
A28	AD22	A75	+5V	B28	GND	B75	AD53
A29	AD20	A76	AD52	B29	AD21	B76	GND
A30	GND	A77	AD50	B30	AD19	B77	AD51
A31	AD18	A78	GND	B31	+3.3V	B78	AD49
A32	AD16	A79	AD48	B32	AD17	B79	+5V
A33	+3.3V	A80	AD46	B33	C/BE2_L	B80	AD47
A34	FRAME_L	A81	GND	B34	GND	B81	AD45
A35	GND	A82	AD44	B35	IRDY_L	B82	GND
A36	TRDY_L	A83	AD42	B36	+3.3V	B83	AD43
A37	GND	A84	+5V	B37	DEVSEL_L	B84	AD41
A38	STOP_L	A85	AD40	B38	GND	B85	+5V
A39	+3.3V	A86	AD38	B39	LOCK_L	B86	AD39
A40	SDONE	A87	GND	B40	PERR_L	B87	AD37
A41	SB0_L	A88	AD36	B41	+3.3V	B88	+5V
A42	GND	A89	AD34	B42	SERR_L	B89	AD35
A43	PAR	A90	GND	B43	+3.3V	B90	AD33
A44	AD15	A91	AD32	B44	C/BE1_L	B91	GND
A45	+3.3V	A92	RESERVED	B45	AD14	B92	RESERVED
A46	AD13	A93	GND	B46	GND	B93	RESERVED
A47	AD11	A94	RESERVED	B47	AD12	B94	GND

Table 28.   66MHz, 64-bit PCI Connectors (Slots C and D)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST_L	A48	GND	B1	-12V	B48	AD10
A2	+12V	A49	AD9	B2	TCK	B49	M66EN
A3	TMS	A50	GND	B3	GND	B50	GND
A4	TDI	A51	GND	B4	TDO	B51	GND
A5	+5V	A52	C/BEO_L	B5	+5V	B52	AD8
A6	INTA_L	A53	+3.3V	B6	+5V	B53	AD7
A7	INTC_L	A54	AD6	B7	INTB_L	B54	+3.3V
A8	+5V	A55	AD4	B8	INTD_L	B55	AD5
A9	RESERVED	A56	GND	B9	PRSNT1_L	B56	AD3
A10	+3.3V	A57	AD2	B10	RESERVED	B57	GND
A11	RESERVED	A58	AD0	B11	PRSNT2_L	B58	AD1
A12	3.3V Keyway	A59	+ 3.3V	B12	3.3V Keyway	B59	+ 3.3V
A13		A60	REQ64_L	B13		B60	ACK64_L
A14	RESERVED	A61	+5V	B14	RESERVED	B61	+5V
A15	RESET_L	A62	+5V	B15	GND	B62	+5V
A16	+3.3V	A63	GND	B16	CLK	B63	RESERVED
A17	GRANT_L	A64	C/BE7_L	B17	GND	B64	GND
A18	GND	A65	C/BE5_L	B18	REQ_L	B65	C/BE6_L
A19	RESERVED	A66	+3.3V	B19	+3.3V	B66	C/BE4_L
A20	AD30	A67	PAR64	B20	AD31	B67	GND
A21	+3.3V	A68	AD62	B21	AD29	B68	AD63
A22	AD28	A69	GND	B22	GND	B69	AD61
A23	AD26	A70	AD60	B23	AD27	B70	+3.3V
A24	GND	A71	AD58	B24	AD25	B71	AD59
A25	AD24	A72	GND	B25	+3.3V	B72	AD57
A26	IDSEL	A73	AD56	B26	C/BE3_L	B73	GND
A27	+3.3V	A74	AD54	B27	AD23	B74	AD55
A28	AD22	A75	+3.3V	B28	GND	B75	AD53
A29	AD20	A76	AD52	B29	AD21	B76	GND
A30	GND	A77	AD50	B30	AD19	B77	AD51
A31	AD18	A78	GND	B31	+3.3V	B78	AD49
A32	AD16	A79	AD48	B32	AD17	B79	+3.3V
A33	+3.3V	A80	AD46	B33	C/BE2_L	B80	AD47
A34	FRAME_L	A81	GND	B34	GND	B81	AD45
A35	GND	A82	AD44	B35	IRDY_L	B82	GND
A36	TRDY_L	A83	AD42	B36	+3.3V	B83	AD43
A37	GND	A84	+3.3V	B37	DEVSEL_L	B84	AD41
A38	STOP_L	A85	AD40	B38	GND	B85	+5V
A39	+3.3V	A86	AD38	B39	LOCK_L	B86	AD39
A40	SDONE	A87	GND	B40	PERR_L	B87	AD37
A41	SB0_L	A88	AD36	B41	+3.3V	B88	+3.3V
A42	GND	A89	AD34	B42	SERR_L	B89	AD35
A43	PAR	A90	GND	B43	+3.3V	B90	AD33
A44	AD15	A91	AD32	B44	C/BE1_L	B91	GND
A45	+3.3V	A92	RESERVED	B45	AD14	B92	RESERVED
A46	AD13	A93	GND	B46	GND	B93	RESERVED
A47	AD11	A94	RESERVED	B47	AD12	B94	GND

Configuration Switches

One header provides eight switches that control various configuration options. Figure 57 shows the switches.

SW4G1

Reserved	1	
Recovery Boot	2	
Spare	3	
BIOS Write Enable	4	
Clear CMOS	5	
Password Clear	6	
PHP Override	7	
Reserved	8	
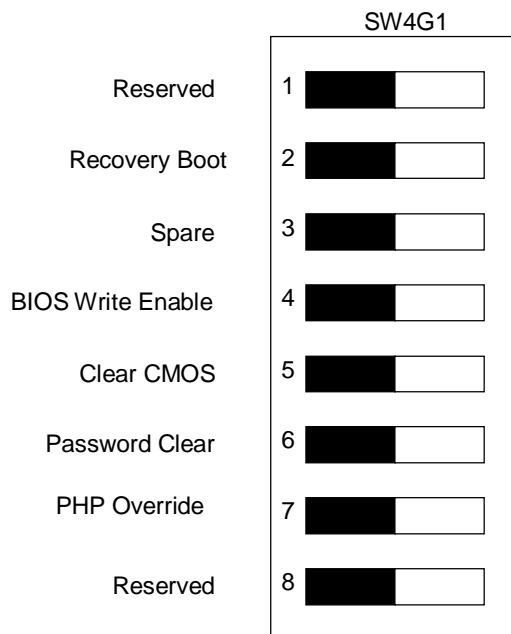
Figure 57. I/O Carrier Configuration Switches

Table 29.   I/O Carrier Switch Summary

Items in bold show default placement for each configurable option.

Function	Switch Number	Default Setting	What it does at system reset
Reserved	1	**Disabled**	N/A
Recovery Boot	2	Enabled	BIOS attempts a recovery boot, loading BIOS code from a diskette into the flash device. This is typically used when BIOS code has been corrupted.
		Disabled	System attempts to boot using BIOS stored in flash memory.
Spare (Reserved)	3	**Disabled**	N/A
BIOS Update	4	Disabled	No BIOS flash update allowed.
		Enabled	Allow BIOS flash update.
CMOS Clear	5	Enabled	Replaces the contents of NVRAM with the manufacturing default settings.
		Disabled	Preserves the contents of NVRAM.
Password Clear	6	Enabled	Clears the current system password.
		Disabled	Maintains the password.
PHP Override	7	**Disabled**	N/A
Reserved	8	**Disabled**	N/A

General Procedure to Change Switch Settings

1. Observe the safety and ESD precautions at the beginning of Chapter 5 (page 93).
2. Turn off all connected peripherals and turn off system power.
3. Remove the PCI hot-plug cover. You do not need to remove the I/O carrier from the chassis. Due to the location of the switch block, an add-in card populated in slot 3 may need to be removed.
4. Refer to Figure 56 on page 173 for Switch SW4G1 location. In the figure, the switch is located to the left and slightly below the PCI Slot number 3 on the I/O board. When you are looking at the actual system, the board will be turned 90 degrees, and the switch will be located to the right and slightly below PCI Slot number 3 on the I/O board. A diagram of the switch configuration is also located on the underside of the PCI hot-plug cover.
5. The switch block is shown with all switches in the open or disabled position by default.
6. Move the individual switch for the desired setting.
7. Power on the system for the change to take effect.
8. Return the switch to its' default position after the desired operation is complete.

CMOS Clear Switch

1. Ensure that the system is powered off. Remove the PCI hot-plug cover. On switch SW4G1, slide or press switch number 5 to the right most position.
2. Power on the system. Wait for POST to complete and for the messages "NVRAM cleared by jumper" and "Press F2 to enter Setup" to appear. This automatically reprograms CMOS to the default settings, except for the password.
3. Enter Setup and make any changes necessary (for example, changing the boot device). Press F10 to save the new Setup configuration and exit Setup.
4. Power off the system.
5. Return switch position 5 to the left most (default) position.
6. Reinstall the PCI hot-plug cover using the original screws, power on the system, and resume normal operation.
7. Run BIOS Setup or the SSU to verify the correct settings. See Chapter 3.

Password Clear Switch

1. Ensure that the system is powered off. Remove the PCI hot-plug cover. On switch SW4G1, slide or press switch number 6 to the right most position.
2. Power on the system. Wait for POST to complete and for the messages "Password cleared by jumper" and "Press F2 to enter Setup" to appear. This automatically clears the password.
3. Enter Setup and make any changes necessary (for example, changing the boot device). Press F10 to save the new Setup configuration and exit Setup.
4. Power off the system.
5. Return switch position 6 to the left most (default) position.
6. Reinstall the PCI hot-plug cover using the original screws, power on the system, and resume normal operation.

Recovery Boot Switch

1. Ensure that the system is powered off. Remove the PCI hot-plug cover. On switch SW4G1, slide or press switch number 2 to the right most position.
2. Ensure that the BIOS diskette is bootable and that all BIOS files to include the recovery file are on the diskette. The BIOS recovery file will have a `*.rec` file extension, for example, `bios.rec`. Insert the BIOS recovery diskette in drive A and then power on the system. After the system boots, the speaker emits a single beep and the recovery process begins. This takes about three minutes. When the recovery process completes, the speaker emits two beeps.

While in the recovery mode, there is no screen display on the monitor. The keyboard is disabled as the system automatically recovers BIOS. The following beep codes describe the recovery status.

Beep Code	Message
2	Successful completion, no errors.
4	The system could not boot from the diskette. The diskette may not be bootable.
Continuous series of low beeps	The wrong BIOS recovery files are being used and/or the recovery switch is in the wrong position.

3. Power off the system.
4. Return switch position 2 to the left most (default) position.
5. Reinstall the PCI hot-plug cover using the original screws, remove the diskette from drive A. Power on the system, and resume normal operation.

System I/O Addresses

Table 30 shows the location in I/O space of all directly I/O-accessible registers.

Table 30.   System I/O Addresses

I/O Address	Resource	I/O Address	Resource
0000 – 001F	DMA controller	0170 – 0177	Secondary IDE controller
0020 – 0021	Interrupt controller 1	01F0 – 01F7	Primary IDE controller
0022 – 0040	Unused/reserved	0278 – 027F	Parallel port 2 (relocatable)
0040 – 005F	Programmable timer	02E8 – 02EF	Serial port 4 (relocatable)
0060 & 0064	Keyboard controller	02F8 – 02FF	Serial port 2 (relocatable)
0061	NMI status & control register	0370 – 0377	Secondary diskette
0070	NMI mask bit and RTC index address	0378 – 037F	Parallel port 1 (relocatable)
0071	RTC	03BC – 03BF	Parallel port 3
0072	RTC extended index register	03E8 – 03EF	Serial port 2 (relocatable)
0073	RTC extended data register	03F8 – 03FF	Serial port 1 (relocatable)
0080 – 008F	DMA low page register	0CF8	PCI config address register
0092	Port 92 register	0CFC	PCI data address register
00A0 – 00A1	Interrupt controller 2	0CF9	Reset control
00B2	Advanced pwr management control	04D0 – 04D1	INTC edge/level register
00B3	Advanced power management status	0C00 – 0C7F	Pwr management base address
00C0-00DF	DMA controller	0CA8 – 0CAF	SMIC decoder
00F0	Coprocessor error	0CC0 – 0CCF	SM base address
		2000 – FFFF	Allocated to the PCI devices

Memory Map

Table 31 lists the system memory map. When BIOS allocates memory space to PCI devices, it starts just below the APICs and continues downward. Assigning memory space to PCI devices does not decrease the total available memory in the system because this memory is "reclaimed" above 4 GB.

The server does not support memory gaps from 512 KB to 640 KB and from 15 MB to 16 MB. These regions are treated as normal system memory.

Table 31.   Memory Map

Address Range	Amount	Function
00000000 – 0009FFFF	640K	Base (conventional) System Memory
000A0000 – 000AFFFF	128K	ISA Video buffer
000C0000 – 000D7FFF	96K	Add-in Options ROM's (Video, SCSI…)
000C0000 – 000D7FFF	96K	Add-in Options ROM's
000D8000 – 000DBFFF	16K	Allocated to Run time user binary if enabled/programmed, otherwise can be used for options ROM's
000DC000 – 000DFFFF	16K	Allocated to Console Redirection if enabled, otherwise can be used for options ROM's
000E0000 – 000FFFFF	128K	System BIOS Shadowed
00100000 – PCI Memory allocated to first PCI device		Typically it can go up to 3GB
FEC00000 – FEC0FFFF	64K	Reserved. Unused on this platform Reclaimed. If main memory exceeds this region
FEC10000 – FEC1FFFF	64K	IOAPIC allocated to the PID Reclaimed. If main memory exceeds this region
FEC20000 – FECFFFFF	896K	Reserved Reclaimed. If main memory exceeds this region
FEE00000 – FEF00000	1MB	LOCAL APIC Reclaimed. If main memory exceeds this region
FF000000 – FFDFFFFF	14MB	Unused. Reclaimed. If main memory exceeds this region
FFE00000 – FFFFFFFF	2MB	Main System BIOS
100000000 – 1FFFFFFFF	4GB	If memory exists

PCI Configuration and Device Map

Table 32.   PCI Map

Device	Segment	Device Number
Hot Plug Controller	A	00h
PCI Slot 1	A	04h
PCI Slot 2	A	05h
Embedded LVDS	A	0Ah
Embedded VGA	A	0Ch
PIIX4e	A	0Fh
MAC	A	14h
PB64	A	18h
PB64	A	19h
PB64	A	1Ah
PB64	A	1Bh
Hot Plug Controller	B	00h
PCI Slot 3	B	04h
PCI Slot 4	B	05h
PCI Slot 5	B	06h
PCI Slot 6	B	07h
PID	B	09h
Hot Plug Controller	C	00h
PCI Slot 7	C	04h
PCI Slot 8	C	05h
Hot Plug Controller	D	00h
PCI Slot 9	D	04h
PCI Slot 10	D	05h

Interrupts

The table below recommends the logical interrupt mapping of interrupt sources; it reflects a typical configuration, but these interrupts can be changed by the user. Use the information to determine how to program each interrupt. The actual interrupt map is defined using configuration registers in the PIIX4E and the I/O controller. I/O Redirection Registers in the I/O APIC are provided for each interrupt signal; the signals define hardware interrupt signal characteristics for APIC messages sent to local APIC(s).

⟹ **NOTE**

> **To disable either IDE controller and reuse the interrupt:** If you plan to disable either IDE controller to reuse the interrupt for that controller, you must physically unplug the IDE cable from the board connector (IDE0) if a cable is present. Simply disabling the drive by configuring the SSU option does not make the interrupt available.

Table 33.   Interrupts

PID Interrupt	PCI Interrupt	Component/PCI Slot #	PCI Bus
0	D	P10	PCI-D
1	C	P10	PCI-D
2	B	Onboard SCSI Channel B	PCI-A
3	B	P10	PCI-D
4	A	P10	PCI-D
5	D	P9	PCI-D
6	C	P9	PCI-D
7	B	P9	PCI-D
8	A	P9	PCI-D
9	D	P8	PCI-C
10	C	P8	PCI-C
11	B	P8	PCI-C
12	A	P8	PCI-C
13	D	P7	PCI-C
14	C	P7	PCI-C
15	B	P7	PCI-C
16	A	P7	PCI-C
17	D	P6	PCI-B
18	C	P6	PCI-B
19	B	P6	PCI-B
20	A	P6	PCI-B
21	D	P5	PCI-B
22	C	P5	PCI-B
23	B	P5	PCI-B
24	A	P5	PCI-B
25	D	P4	PCI-B
26	C	P4	PCI-B
27	B	P4	PCI-B
28	A	P4	PCI-B
29	D	P3	PCI-B
30	C	P3	PCI-B
31	B	P3	PCI-B
32	A	Video	PCI-A
33	D	PIIX4e	PCI-A
34	A	P3	PCI-B
35	D	P2	PCI-A
36	C	P2	PCI-A
37	B	P2	PCI-A
38	A	P2	PCI-A
39	D	P1	PCI-A
40	C	P1	PCI-A
41	B	P1	PCI-A
42	A	Onboard SCSI Channel A	PCI-A
43	PCI Hotplug Interrupt	P1 – P10	All
44	SCBERR#	MAC	---
45	A	P1	PCI-A
46	NMI	PIIX4e	---
47	Unused	---	---

Video Modes

The CL-GD5480 integrated video controller provides all standard IBM VGA modes. With
8 MB of SDRAM standard. The ATI Rage Xl supports all the standard VGA, XVGA, SVGA
modes, with a maximum resolution of 1600 x 1200 at 85 Hz. See the ATI Rage XL specification
for more details.

A Power System: Description/Calculating Power Usage

This appendix describes the modular power system and explains how to calculate power usage for your server.

⚠ WARNING

Only a QUALIFIED SERVICE TECHNICIAN is authorized to remove the server covers and to access any of the components inside the server. Before removing the covers, see "Safety: Before You Remove Server Covers" on page 93 and " Warnings and Cautions" on page 94.

Power System

The modular power system for the server is provided by up to three 750 watt autoranging power supplies and a midplane. The power system may be configured with two power supplies (standard) or three power supplies (2 + 1, redundant). The power supplies are mounted in a 2 + 1 pattern in the back of the chassis along the bottom. Each power supply has an integrated fan for cooling.

The midplane provides connectors for the hot-swap power supplies. The midplane also provides the interface logic for power supply related management functions such as

- Power supply presence detection.
- Power supply fault signal reporting.

Care must be taken not to overload a branch circuit of the AC mains by plugging too many power cords into a single AC circuit. We recommend plugging the power cord of the server into a separate circuit.

If a power supply fails in the redundant power system, the yellow power supply failure LED on the front panel starts flashing. The supply can be hot-swapped—removed and replaced—without turning off the power or impacting server operations (providing that 3 power supplies are installed.

Power Supply Input Voltages

Table 34.   Power Supply AC Input Ratings

Parameter	Minimum	Nominal	Maximum	Units
V in (230)	90 / 180	110-120 / 200-240	132 / 264	V RMS
V in Frequency	47	50 / 60	63	Hz
AC Input Current		13 A @ 110 VAC 7 A @ 220 VAC		Ampere

The 750 watt autoranging power supplies are capable of handling up to two hard drives at 28 watts per drive (typical 3.5-inch wide by 1-inch high, 10 K RPM drives), eight processors at a maximum of 65 watts per processor, and up to 32 GB of PC100 registered DIMMs.

The total power requirement for the board set exceeds the 240 VA energy hazard limit that defines an operator-accessible area. The 240 VA protection circuits protect the user from a 240 VA energy hazard while hot-swapping—installing or removing—a hard disk drive or fan system.

Power Supply Output Voltages

Table 35.   Power Supply Output Ratings (110 V / 220 V)

Power Supply Outputs	Individual Supply	Two Supplies[1] Nonredundant	Three Supplies[1] Redundant
3.3 V	31 A / 36 A	58 A / 68 A	58 A / 68 A
5 V	31 A / 36 A	58 A / 64 A	58 A / 64 A
12 V	31 A / 36 A	58 A / 68 A	58 A / 68 A
-12 V	1 A	1 A	1 A
5 V Standby	1 A	1.75 A	1.75 A
Vbias = + 15 V	200 mA	200 mA	100 mA

1   Forced load sharing is for 5, 3.3, and 12 V only. The +5 V standby load sharing is the technique for passive load sharing.

Server Current Usage

Table 36 lists the current usage for both minimally and fully configured servers. You can easily calculate power usage in the server from the numbers provided. The table is for reference only. It is not meant to provide the exact current usage in the server; exact values depend on exact configuration—size and number of processors, DIMMs, hard drives, add-in boards, etc.

Table 36.   Server Boardset Voltages and Currents

Board	Spec[2]	Units	+3.3V	+5V	+12V	-12V	+5 VSB	+15 VSB	Power
I/O carrier									
	Min load	Adc	0.20	0.70	0.00	0.20	0.65	0.00	9.81
	Max load	Adc	7.99	45.20	5.00	1.20	0.75	0.00	330.52
	Max step load	Adc	2.00	12.17	4.50	0.25	0.10	0.00	
Profusion carrier with mezzanines									
	Min load	Adc	4.60	0.75	0.25	0.000	0.00	0.00	21.93
	Max load	Adc	12.00	1.50	46.00	0.000	0.00	0.00	599.10
	Max step load	Adc	2.00	0.75	18.00			0.00	
Front panel (plugs into profusion carrier)									
	Min load	Adc	0.00	0.05	2.00	0.001	0.10	0.00	24.76
	Max load	Adc	0.00	0.23	5.40	0.010	0.25	0.00	67.32
	Max step load	Adc		0.18	0.10	0.001	0.15	0.00	
Memory carrier 1									
	Min load	Adc	1.20	0.00	0.00	0.000	0.00	0.00	3.96
	Max load	Adc	23.00	0.00	0.00	0.000	0.00	0.00	75.90
	Max step load	Adc	8.00						
Memory carrier 2[1]									
	Min load	Adc	0.00	0.00	0.00	0.000	0.00	0.00	0.00
	Max load	Adc	23.00	0.00	0.00	0.000	0.00	0.00	75.90
	Max step load	Adc	8.00						
Peripherals (SCSI backplane)									
	Min load	Adc	0.00	0.70	0.25	0.000	0.00	0.00	6.50
	Max load	Adc	0.00	4.50	5.99	0.000	0.00	0.00	94.38
	Max step load	Adc		0.90	5.40				
Midplane									
	Min load	Adc							
	Max load	Adc	0.01	0.01	0.01			0.20	0.20
Total min load		Adc	6.00	2.20	2.50	0.20	0.75	0.00	66.96
Total max step load		Adc	20.00	14.00	28.00	0.25	0.25	0.05	
Max step di/dt		A/uS	0.50	1.00	0.60	0.10	0.10	0.05	
Total max load		Adc	66.00	51.44	62.40	1.21	1.00	0.20	
Total load pwr: 1246.32		W	217.8	257.2	748.80	14.52	5	3	1246.32
Total power (includes 2% distribution loss)									1271.24

1   Minimum load for second memory board is zero; this assumes no board is installed.

2   See Table 37 for definition of minimum and maximum configurations.

Table 37.   Minimum/Maximum Current Rating Configurations

Board	Minimum Configuration	Maximum Configuration
I/O carrier	I/O carrier, I/O riser board	I/O carrier, I/O riser board, PCI adapter boards (10 at maximum load)
Profusion carrier	Profusion carrier, processor mezzanine board (one), Pentium III Xeon processor (one), A450NX processor termination modules (three)	Profusion carrier, processor mezzanine boards (two), Pentium III Xeon processor (eight at FMB maximum load), cache coherency boards (two at 4 Tag configuration)
Memory carrier (each)	Memory carrier, 128 MB DIMM (one) (one memory carrier only)	Memory carrier, 256 MB DIMM (16)
Front panel	Front panel	Front panel
Midplane	Midplane	Midplane
Peripheral bay	One diskette drive, one CD-ROM drive, SCSI backplane	One diskette drive, one CD-ROM drive, two hard disk drives, SCSI backplane

Calculating Power Usage

Use the worksheet in Table 38 to calculate the total DC power used by your server configuration.

The documentation that comes with each add-in device should specify its current and voltage requirements.

To calculate the total combined wattage for your server:

1.   List the current for each board and device in the appropriate voltage level column in the table.
2.   Add the currents in each column of the table.
3.   Multiply the voltage by the total current to get the total wattage for each voltage level.
4.   Add the total wattage for each voltage level to arrive at a total combined power usage on the power supply.

Table 38.   Worksheet for Calculating DC Power Usage

Device	Current (maximum) at voltage levels:			
	+3.3 V	+5 V	+12 V	-12 V
PHP I/O carrier	5 A	4.25 A	2 A	1 A
64-bit PCI slot 1, P1				
64-bit PCI slot 2, P2				
64-bit PCI slot 3, P3				
64-bit PCI slot 4, P4				
64-bit PCI slot 5, P5				
64-bit PCI slot 6, P6				
64-bit PCI slot 7, P7				
64-bit PCI slot 8, P8				
64-bit PCI slot 9, P9				
64-bit PCI slot 10, P10				
Profusion carrier with four 65 W processors	4.6 A	6.2 A	28.5 A	
Profusion carrier with four 65 W processors	4.6 A	6.2 A	28.5 A	
Memory module (16 DIMMs)	12.03 A			
Memory module (16 DIMMs)	12.03 A			
3.5-inch diskette drive		0.3 A		
CD-ROM drive		0.4 A	1.0 A	
1st SCA SCSI hard disk drive				
2nd SCA SCSI hard disk drive				
Six cooling fans (.49 A/fan @ 12 V)				
Total Current				

⇒ **NOTE**

The total combined wattage must be less than 1232 watts for your server configuration. The power must be less than:

- 201 watts for +3.3 V
- 340 watts for +5 V
- 672 watts for +12 V
- 12 watts for -12 V
- 2.4 watts for 24 V
- 5 watts for +5 V standby

Table 39.   Total Combined Power Used by Your Server

Voltage Level and Total Current (V x A = W)		Total Watts for Each Voltage Level
(+3.3 V) x (	A)	W
(+5 V) x (	A)	W
(-5 V) x (	A)	W
(+12 V) x (	A)	W
(-12 V) x (	A)	W
(+24 V) x (	A)	W
Total Combined Wattage =		**W**

B Equipment Log and Configuration Worksheets

Equipment Log

Use the blank equipment log provided here to record information about your system. You will need some of this information when you run the SSU.

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
Profusion carrier			
I/O carrier			
Processor speed and cache			
Video display			
Keyboard			
Mouse			
Diskette drive A			
Diskette drive B			
Tape drive			
CD-ROM drive			
Hard disk drive 1			
Hard disk drive 2			
Hard disk drive 3			
Hard disk drive 4			
Hard disk drive 5			

Equipment Log (continued)

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
SCSI host adapter board 1			

Equipment Log and Configuration Worksheets

Configuration Worksheets

The rest of this chapter consists of worksheets to record the settings you make when configuring the system using the SSU, BIOS Setup, and the QLogic SCSI Utility. If default values ever need to be restored to CMOS (e.g., after a CMOS-clear), you must reconfigure the system. Referring to the filled-in worksheets could make your task easier.

Circle or write in your selections or the values that are displayed onscreen.

SSU Worksheets

Add and Remove Boards

Worksheet 1. Add/Remove Boards

System board	
PCI Host Bridge Device	Bus 0 Dev 0
PCI SCSI Device	Bus 0 Dev B
PCI Ethernet Device	Bus 0 Dev 10
PCI VGA Device	Bus 0 Dev 12
PCI Multifunction Device	Bus 0 Dev 14

System board (SSU, Change Configuration Settings)

Worksheet 2. Systems Group

System Identification and Version Information	
SSU Configuration File Version	
MP Spec. Version	1.1 / 1.4
Processor Speed Setting	

Worksheet 3. Memory Subsystem Group

Onboard Disk Controllers	
Onboard Communication Devices	Enable / Disable

Worksheet 4. Onboard Disk Controllers

Onboard Diskette Controller	Enable / Disable
Primary Onboard IDE Controller	Enable / Disable
Secondary Onboard IDE Controller	Enable / Disable

Worksheet 5. Onboard Communications Devices

Serial Port 1 Configuration	
Serial Port 2 Configuration	
Serial Port 2 Mode	
Parallel Port Configuration	
Parallel Port Mode	

Worksheet 6. Diskette Drive Subsystems Group

Diskette drive A Options	
Diskette drive B Options	

Worksheet 7. IDE Subsystem Group

IDE Configuration Primary Master	(drive name) None / User / Auto / CD
IDE Drive Options Primary Master	2 Sector/Block / 4 Sector/Block 8 Sector/Block / 16 Sector/Block / Disable
Transfer Mode Primary Master	PIO 1 / PIO 2 / PIO 3 / PIO 4
IDE Configuration Primary Slave	(drive name) None / User / Auto / CD
IDE Drive Options Primary Slave	2 Sector/Block / 4 Sector/Block / 8 Sector/Block / 16 Sector/Block / Disable
Translation Mode Primary Slave	Standard CHS Logical Block Addressing
Transfer Mode Primary Slave	PIO 1 / PIO 2 / PIO 3 / PIO 4

Worksheet 8. Multiboot Group

Boot Device Priority	Diskette Drive
	Removable Devices
	Hard Drive
	ATAPI CD-ROM Drive
	Diagnostic Boot

Worksheet 9. Keyboard and Mouse Subsystem Group

Typematic Delay	250 ms delay / 500 ms delay
	750 ms delay / 1000 ms delay
Typematic Speed	30 CPS / (other)
Mouse Control option	Mouse Enabled / Disabled

Worksheet 10. Console Redirection

COM Port for Redirection	Port 3F8/IRQ4 / Port 2F8/IRQ3
	Port 3E8h/IRQ 3 / Disable
Serial Port baud rate	9600 / 19.2k / 38.4k / 115.2k
Hardware Flow Control	None / CTS/RTS / CTS/RTS + CD / Xoff/Xon
Terminal Type	PC - ANSI / VT 100

Worksheet 11. Security Subsystems

Administrative Password	Disable / Enable
User Password	Disable / Enable
Secure Mode Hot-Key	None / Ctrl-Alt-{ }
Lockout Timer	Disable / { } minutes
Secure Boot Mode	Disable / Enable
Video Blanking	Disable / Enable
Diskette Writes	Disable / Enable
Reset/Power Switch Locking	Disable / Enable

Worksheet 12. SCSI ROM BIOS Options Group

Onboard SCSI ROM BIOS scan	Enable / Disable

Worksheet 13. Management Subsystem Group

System Sensor Control	Write your selections on the separate "Management Subsystem, System Sensor Control Worksheet" on page 202.
SMM Enable	Enable / Disable
Event Logging	Enable / Disable
PCI System Error Detection	Enable / Disable

Management Subsystem, System Sensor Control Worksheet

For each sensor control, the display includes the choices shown below, with blanks for entering values. Write in both the sensor control and the values you select. This worksheet (two pages) provides space for a number of sensor controls; if you need more space, copy these pages to extend your worksheet.

Item:
Disable / Enable
Upper Fatal: _____
Upper Warning: _____
Lower Warning: _____
Lower Fatal:

Item:
Disable / Enable
Upper Fatal: _____
Upper Warning: _____
Lower Warning: _____
Lower Fatal:

Item:
Disable / Enable
Upper Fatal: _____
Upper Warning: _____
Lower Warning: _____
Lower Fatal:

Item:
Disable / Enable
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Lower Warning: _____
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Item:
Disable / Enable
Upper Fatal: _____
Upper Warning: _____
Lower Warning: _____
Lower Fatal:

Item:	
Disable / Enable	
Upper Fatal:	
Upper Warning:	
Lower Warning:	
Lower Fatal:	

Item:	
Disable / Enable	
Upper Fatal:	
Upper Warning:	
Lower Warning:	
Lower Fatal:	

Item:	
Disable / Enable	
Upper Fatal:	
Upper Warning:	
Lower Warning:	
Lower Fatal:	

Item:	
Disable / Enable	
Upper Fatal:	
Upper Warning:	
Lower Warning:	
Lower Fatal:	

BIOS Setup Worksheets

Worksheet 14. Main Menu

System Date	
System Time	
Legacy Diskette A	Disabled / 360 KB / 1.2 MB / 720 KB 1.44 MB/1.25 MB / 2.88 MB
Legacy Diskette B	Disabled / 360 KB / 1.2 MB / 720 KB / 1.44 MB / 2.88 MB
Language	English / Spanish / Italian / French / German

Worksheet 15. IDE Submenu

Type	Auto / CD-ROM / User / 1-39
Cylinders	
Heads	
Sectors	
Maximum Capacity	
MultiSector Transfer	Disabled / 2 / 4 / 8 / 16
LBA Mode Control	Disabled / Enabled
32 Bit I/O	Disabled / Enabled
Transfer Mode	Standard / Fast PIO 1 / Fast PIO 2 / Fast PIO 3 / Fast PIO 4
Ultra DMA	Disabled / Mode 0 / Mode 1 / Mode 2

Worksheet 16. Keyboard Features Submenu

Num Lock	Auto / On / Off
Key Click	Disabled / Enabled
Keyboard autorepeat rate	30 / 26.7 / 21.8 / 18.5 / 13.3 / 10 / 6 / 2
Keyboard autorepeat delay	¼ / ½ / ¾ / 1

Worksheet 17. Advanced Menu

Reset Configuration Data	Yes / No
Use Multiprocessor Specification	1.1 / 1.4
Large Disk Access Mode	LBA / CHS
Pause Before Boot	Enabled / Disabled

Worksheet 18. PCI Mode Submenu

Option ROM Scan	Disabled / Enabled
Enable Master	Disabled / Enabled
Latency Timer	Default / <time>

Worksheet 19. PCI Devices Submenu

Option ROM Scan	Disabled / Enabled
Enable Master	Enabled / Disabled
Latency Timer	Default / <time>

Worksheet 20. I/O Device Configuration Submenu

Serial Port A	Disabled / Enabled / Auto / OS Controlled
Base I/O Address	3F8h / 2F8h / 3E8h / 2E8h
Interrupt	4 / 3
Serial Port B	Disabled / Enabled / Auto / OS Controlled
Base I/O Address	3F8h / 2F8h / 3E8h / 2E8h
Interrupt	4 / 3
Parallel Port	Disabled / Enabled / Auto / OS Controlled
Mode	Output only / Bidirectional / EPP / ECP
Base I/O Address	378 / 278 / 178 / 3BC
Interrupt	5 / 7
DMA channel	1 / 3
Diskette controller	Disabled / Enabled

Worksheet 21. Advanced Chipset Control Submenu

Base RAM Step	1 MB / 1 KB / Every location
Extended RAM Step	1 MB / 1 KB / Every location
L2 Cache	Enabled / Disabled
ISA Expansion Aliasing	Enabled / Disabled
Memory Scrubbing	Enabled / Disabled
Restreaming Buffer	Enabled / Disabled
Multiboot Support	Enabled / Disabled

Worksheet 22. Security Menu

Administrator Password is	Clear / Set
User Password is	Clear / Set
Password on Boot	Disabled / Enabled
Secure Mode Timer	Disabled / <time>
Secure Mode Hot Key	<key stroke>
Secure Mode Boot	Disabled / Enabled
Video Blanking	Disabled / Enabled
Diskette Write Protect	Disabled / Enabled

Worksheet 23. Server Menu

Processor Retest	No / Yes
EMP Password Switch	Disabled / Enabled
EMP Access Mode	Preboot Only / Always Active / Disabled
EMP Restricted Access Mode	Enabled / Disabled
EMP Direct Connect/Modem Mode	Direct Connect / Modem Mode

Worksheet 24. System Management Submenu

Firmware SMIs	Disabled / Enabled
System Event Logging	Disabled / Enabled
Clear Event Log	Disabled / Enabled
Assert NMI on SBE	Disabled / Enabled
Assert NMI on AERR	Disabled / Enabled
Assert NMI on BERR	Disabled / Enabled
Assert NMI on PERR	Disabled / Enabled
Assert NMI on SERR	Disabled / Enabled
Enabled Host Bus ECC	Disabled / Enabled

Worksheet 25. Console Redirection Submenu

COM Port Address	Disabled / 3F8 / 2F8 / 3E8
IRQ#	3 / 4
Baud Rate	9600 / 19.2k / 38.4k / 115.2k
Flow Control	None / CTS/RTS / XON/XOFF / CTS/RTS + CD

Worksheet 26. Boot Menu

Diskette Check	Disabled / Enabled
Maximum No. of I2O Drives	1 / 4
Message Timeout Multiplier	1 / 2 / 8 / 10 / 50 / 100 / 1000
Pause During Post	Disabled / Enabled

Worksheet 27. Boot Device Priority Submenu

Boot Priority 1	Diskette Drive / <other>
Boot Priority 2	Removable Devices / <other>
Boot Priority 3	Hard Drive / <other>
Boot Priority 4	ATAPI CD-ROM Drive / <other>

C Regulatory Specifications

Regulatory and Environmental Specifications

Environmental Specifications

Operating temperature	10 °C to 35 °C (50 °F to 95 °F). See Altitude exception.
Nonoperating temperature	-40 °C to 70 °C (-40 °F to 158 °F).
Altitude	0 to 3048 m (0 to 10000 ft.). Note: Maximum ambient temperature is linearly de-rated between 1520 m (5000 ft.) and 3050m (10000 ft.) by 1°C per 305 m (1000 ft.).
Operating humidity	85%, noncondensing at 40 °C (104 °F). <33°C (91.4 °F) wet bulb at 40 °C (104 °F) without peripherals.
Nonoperating humidity	95%, noncondensing at +55 °C (131 °F).
Safety	UL 1950, CSA 950, IEC 950, TUV EN60 950, NEMKO.
Emissions	Certified to FCC Class A; tested to CISPR 22B, EN 55022, and registered with VCCI.
Immunity	Verified to comply with EN 50082-2.
Electrostatic discharge (ESD)	Tested to ESD levels up to 20 kilovolts (kV) air discharge without physical damage as per Intel environmental test specification.
Acoustic	Sound pressure: <57 dbA at ambient temperatures. <28 °C measured at bystander positions in operating mode. Sound power: <6.5 BA at ambient temperatures. <28 °C in operating mode.

Declaration of the Manufacturer or Importer

We hereby certify that this product is in compliance with EU EMC Directive 89/336/EEC and the Low Voltage Directive 73/23/EEC.

Safety Compliance

USA/Canada:	UL 1950, 3rd Edition/CSA 22.2, No. 950-M93, 3rd Edition.
Europe:	TUV to EN60950 2nd Edition with Amendments, A1 + A2 + A3 + A4.
International:	CB Certificate and Report to IEC 950, 2nd Edition w/ A1 + A2 + A3 + A4 and national deviations, including EMKO-TSE (74-SEC) 207/94.

Electromagnetic Compatibility (EMC)

USA:	FCC CFR 47 Part 15, Class A
Canada:	IC ICES-003 Class A
Europe:	EN55022, Class A, Radiated & Conducted Emissions EN50082-1 Generic Immunity Standard 　　　EN61000-4-2 Immunity (level 2 contact discharge, level 3 air discharge) 　　　EN61000-4-3 Radiated Immunuty (level 2) 　　　EN61000-4-4 Electrical Fast Transient (level 2) EN61000-3-2 Line Harmonics
International:	CISPR 22/93, Class A
Japan:	VCCI Class A ITE (CISPR 22 B limit) IEC 1000-3-2; Line Harmonics
New Zealand:	CISPR 22/93, Class A
Australia:	AS/NZS 3548 (CISPR 22/93), Class A

Electromagnetic Compatibility Notice (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Electromagnetic Compatibility Notices (International)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

English translation of the notice above:

This is a Class A product based on the standard of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). If this is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe A prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le Ministre Canadian des Communications.

English translation of the notice above:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

D Warnings

WARNING: English (US)
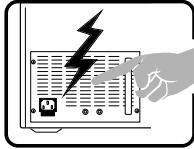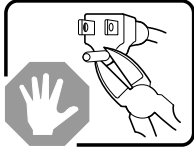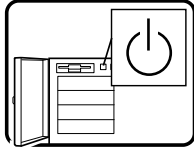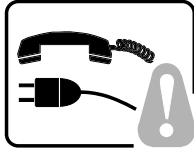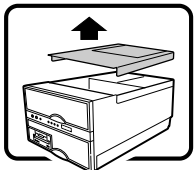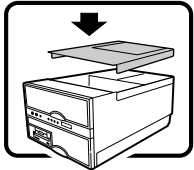
AVERTISSEMENT: Français

WARNUNG: Deutsch

AVVERTENZA: Italiano
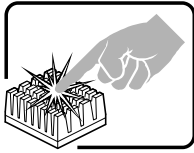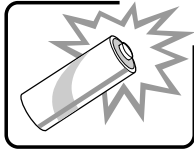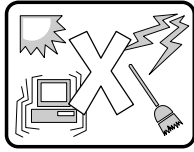
ADVERTENCIAS: Español

WARNING: English (US)
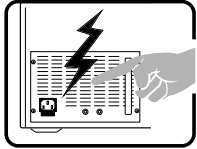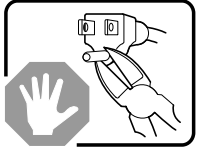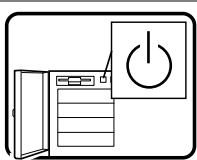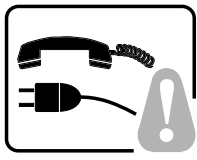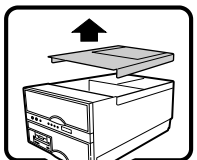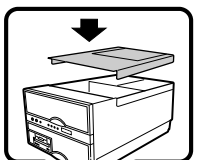
	The power supply in this product contains no user-serviceable parts. There may be more than one supply in this product. Refer servicing only to qualified personnel.
	Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.
	The DC push-button on/off switch on the system does not turn off system AC power. To remove AC power from the system, you must unplug the AC power cord from the wall outlet or power supply.
	SAFETY STEPS: Whenever you remove the chassis covers to access the inside of the system, follow these steps: 1. Turn off all peripheral devices connected to the system. 2. Turn off the system by using the push-button on/off power switch on the system. 3. Unplug all AC power cords from the system or from wall outlets. 4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system. 5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components. 6. Do not operate the system with the chassis covers removed.
	After you have completed the six SAFETY steps above, you can remove the system covers. To do this: 1. Unlock and remove the padlock from the back of the system if a padlock has been installed. 2. Remove and save all screws from the covers. 3. Remove the covers.
	For proper cooling and airflow, always reinstall the chassis covers before turning on the system. Operating the system without the covers in place can damage system parts. To install the covers: 1. Check first to make sure you have not left loose tools or parts inside the system. 2. Check that cables, add-in boards, and other components are properly installed. 3. Attach the covers to the chassis with the screws removed earlier, and tighten them firmly. 4. Insert and lock the padlock to the system to prevent unauthorized access inside the system. 5. Connect all external cables and the AC power cord(s) to the system.
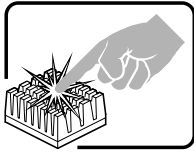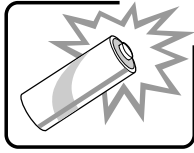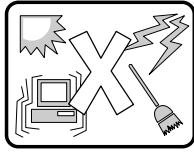
	A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.
	Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.
	The system is designed to operate in a typical office environment. Choose a site that is: • Clean and free of airborne particles (other than normal room dust). • Well ventilated and away from sources of heat including direct sunlight. • Away from sources of vibration or physical shock. • Isolated from strong electromagnetic fields produced by electrical devices. • In regions that are susceptible to electrical storms, we recommend you plug your system into a surge suppresser and disconnect telecommunication lines to your modem during an electrical storm. • Provided with a properly grounded wall outlet. • Provided with sufficient space to access the server power supply cords, because it serves as the product's main power disconnect.

AVERTISSEMENT: Français
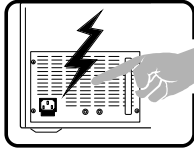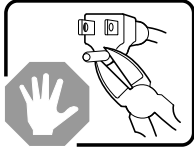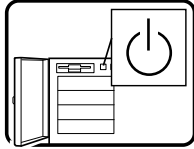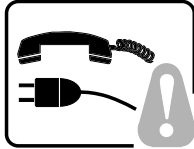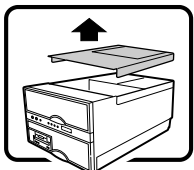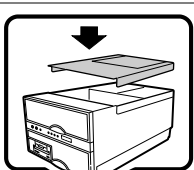
Le bloc d'alimentation de ce produit ne contient aucune pièce pouvant être réparée par l'utilisateur. Ce produit peut contenir plus d'un bloc d'alimentation. Veuillez contacter un technicien qualifié en cas de problème.

Ne pas utiliser ni modifier le cordon d'alimentation secteur fourni, s'il ne correspond pas exactement au type requis.

Le bouton-poussoir Marche/Arrêt de l'alimentation CC situé sur le système ne coupe pas l'alimentation en CA du système. Pour couper toute alimentation en CA au système, vous devez débrancher le cordon d'alimentation secteur de la prise murale ou du bloc d'alimentation.

CONSIGNES DE SÉCURITÉ - Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes :

1. Mettez hors tension tous les périphériques connectés au système.
2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir).
3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales.
4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système.
5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier).
6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.

Une fois TOUTES les étapes précédentes accomplies, vous pouvez retirer les panneaux du système. Procédez comme suit :

1. Si un cadenas a été installé sur à l'arrière du système, déverrouillez-le et retirez-le.
2. Retirez toutes les vis des panneaux et mettez-les dans un endroit sûr.
3. Retirez les panneaux.

Afin de permettre le refroidissement et l'aération du système, réinstallez toujours les panneaux du boîtier avant de mettre le système sous tension. Le fonctionnement du système en l'absence des panneaux risque d'endommager ses pièces. Pour installer les panneaux, procédez comme suit :

1. Assurez-vous de ne pas avoir oublié d'outils ou de pièces démontées dans le système.
2. Assurez-vous que les câbles, les cartes d'extension et les autres composants sont bien installés.
3. Revissez solidement les panneaux du boîtier avec les vis retirées plus tôt.
4. Remettez le cadenas en place et verrouillez-le afin de prévenir tout accès non autorisé à l'intérieur du système.
5. Rebranchez tous les cordons d'alimentation c. a. et câbles externes au système.
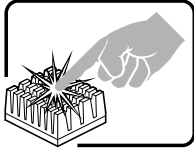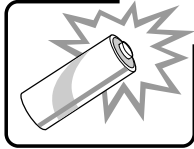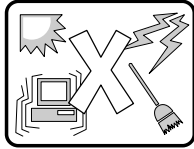
	Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.
	Danger d'explosion si la batterie n'est pas remontée correctement. Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le fabricant. Disposez des piles usées selon les instructions du fabricant.
	Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être :

Le système a été conçu pour fonctionner dans un cadre de travail normal. L'emplacement choisi doit être :

- Propre et dépourvu de poussière en suspension (sauf la poussière normale).
- Bien aéré et loin des sources de chaleur, y compris du soleil direct.
- A l'abri des chocs et des sources de vibrations.
- Isolé de forts champs électromagnétiques géenérés par des appareils électriques.
- Dans les régions sujettes aux orages magnétiques il est recomandé de brancher votre système à un supresseur de surtension, et de débrancher toutes les lignes de télécommunications de votre modem durant un orage.
- Muni d'une prise murale correctement mise à la terre.
- Suffisamment spacieux pour vous permettre d'accéder aux câbles d'alimentation (ceux-ci étant le seul moyen de mettre le système hors tension).
- Un espace suffisant est nécessaire pour accéder au cordon d'alimentation du serveur, celui-ci jouant le rôle de déconnecteur d'alimentation principale du produit.

WARNUNG: Deutsch
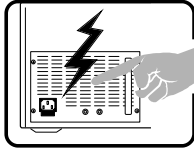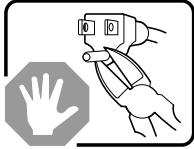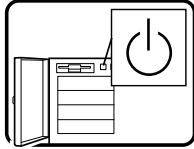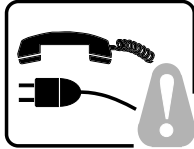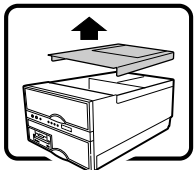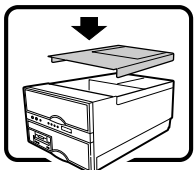
	Benutzer können am Netzgerät dieses Produkts keine Reparaturen vornehmen. Das Produkt enthält möglicherweise mehrere Netzgeräte. Wartungsarbeiten müssen von qualifizierten Technikern ausgeführt werden.
	Versuchen Sie nicht, das mitgelieferte Netzkabel zu ändern oder zu verwenden, wenn es sich nicht genau um den erforderlichen Typ handelt. .
	Der Wechselstrom des Systems wird durch den Ein-/Aus-Schalter für Gleichstrom nicht ausgeschaltet. Ziehen Sie jedes Wechselstrom-Netzkabel aus der Steckdose bzw. Dem Netzgerät, um den Stromanschluß des Systems zu unterbrechen.
	SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten: 1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus. 2. Schalten Sie das System mit dem Hauptschalter aus. 3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose. 4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab. 5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden. 6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.
	Nachdem Sie die oben erwähnten ersten sechs SICHERHEITSSCHRITTE durchgeführt haben, können Sie die Abdeckung abnehmen, indem Sie: 1. Öffnen und entfernen Sie die Verschlußeinrichtung (Padlock) auf der Rückseite des Systems, falls eine Verschlußeinrichtung installiert ist. 2. Entfernen Sie alle Schrauben der Gehäuseabdeckung. 3. Nehmen Sie die Abdeckung ab.
	Zur ordnungsgemäßen Kühlung und Lüftung muß die Gehäuseabdeckung immer wieder vor dem Einschalten installiert werden. Ein Betrieb des Systems ohne angebrachte Abdeckung kann Ihrem System oder Teile darin beschädigen. Um die Abdeckung wieder anzubringen: 1. Vergewissern Sie sich, daß Sie keine Werkzeuge oder Teile im Innern des Systems zurückgelassen haben. 2. Überprüfen Sie alle Kabel, Zusatzkarten und andere Komponenten auf ordnungsgemäßen Sitz und Installation. 3. Bringen Sie die Abdeckungen wieder am Gehäuse an, indem Sie die zuvor gelösten Schrauben wieder anbringen. Ziehen Sie diese gut an. 4. Bringen Sie die Verschlußeinrichtung (Padlock) wieder an und schließen Sie diese, um ein unerlaubtes Öffnen des Systems zu verhindern. 5. Schließen Sie alle externen Kabel und den AC Stromanschlußstecker Ihres Systems wieder an.
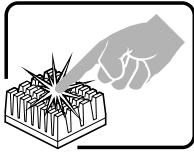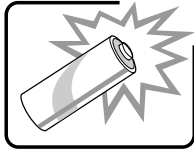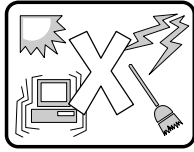
	Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.
	Bei falschem Einsetzen einer neuen Batterie besteht Explosionsgefahr. Die Batterie darf nur durch denselben oder einen entsprechenden, vom Hersteller empfohlenen Batterietyp ersetzt werden. Entsorgen Sie verbrauchte Batterien den Anweisungen des Herstellers entsprechend.
	Das System wurde für den Betrieb in einer normalen Büroumgebung entwickelt. Der Standort sollte: • sauber und staubfrei sein (Hausstaub ausgenommen); • gut gelüftet und keinen Heizquellen ausgesetzt sein (einschließlich direkter Sonneneinstrahlung); • keinen Erschütterungen ausgesetzt sein; • keine starken, von elektrischen Geräten erzeugten elektromagnetischen Felder aufweisen; • in Regionen, in denen elektrische Stürme auftreten, mit einem Überspannungsschutzgerät verbunden sein; während eines elektrischen Sturms sollte keine Verbindung der Telekommunikationsleitungen mit dem Modem bestehen; • mit einer geerdeten Wechselstromsteckdose ausgerüstet sein; • über ausreichend Platz verfügen, um Zugang zu den Netzkabeln zu gewährleisten, da der Stromanschluß des Produkts hauptsächlich über die Kabel unterbrochen wird.

AVVERTENZA: Italiano
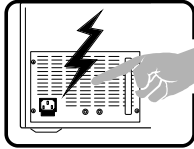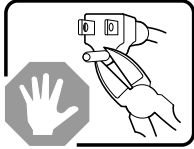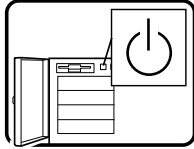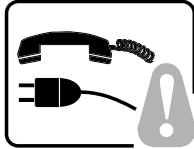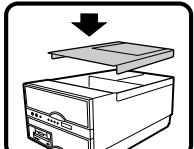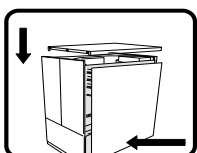
	Rivolgersi ad un tecnico specializzato per la riparazione dei componenti dell'alimentazione di questo prodotto. È possibile che il prodotto disponga di più fonti di alimentazione.
	Non tentare di modificare o utilizzare il cavo di alimentazione in c.a. in dotazione, se non è esattamente del tipo richiesto.
	Il pulsante di Accensione/spegnimento della corrente continua sul sistema non interrompe l'alimentazione in c.a. del sistema. Per scollegare anche l'alimentazione in c.a., è necessario disinserire il cavo di alimentazione in c.a. dalla presa a muro o dall'alimentatore.
	PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi: 1. Spegnere tutti i dispositivi periferici collegati al sistema. 2. Spegnere il sistema, usando il pulsante spento/acceso dell'interruttore del sistema. 3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche. 4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema. 5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema – qualsiasi superficie non dipinta – . 6. Non far operare il sistema quando il telaio è senza le coperture.
	Dopo aver seguito i sei passi di SICUREZZA sopracitati, togliere le coperture del telaio del sistema come seque: 1. Aprire e rimuovere il lucchetto dal retro del sistema qualora ve ne fosse uno installato. 2. Togliere e mettere in un posto sicuro tutte le viti delle coperture. 3. Togliere le coperture.
	Per il giusto flusso dell'aria e raffreddamento del sistema, rimettere sempre le coperture del telaio prima di riaccendere il sistema. Operare il sistema senza le coperture al loro proprio posto potrebbe danneggiare i componenti del sistema. Per rimettere le coperture del telaio: 1. Controllare prima che non si siano lasciati degli attrezzi o dei componenti dentro il sistema. 2. Controllare che i cavi, dei supporti aggiuntivi ed altri componenti siano stati installati appropriatamente. 3. Attaccare le coperture al telaio con le viti tolte in precedenza e avvitarle strettamente. 4. Inserire e chiudere a chiave il lucchetto sul retro del sistema per impedire l'accesso non autorizzato al sistema. 5. Ricollegare tutti i cavi esterni e le prolunghe AC del sistema.
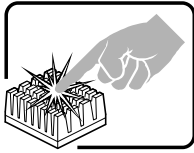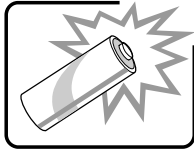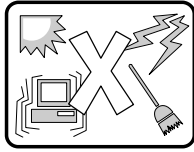
	Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.
	Esiste il pericolo di un esplosione se la pila non viene sostituita in modo corretto. Utilizzare solo pile uguali o di tipo equivalente a quelle consigliate dal produttore. Per disfarsi delle pile usate, seguire le istruzioni del produttore.
	Il sistema è progettato per funzionare in un ambiente di lavoro tipo. Scegliere una postazione che sia:

- Pulita e libera da particelle in sospensione (a parte la normale polvere presente nell'ambiente).
- Ben ventilata e lontana da fonti di calore, compresa la luce solare diretta.
- Al riparo da urti e lontana da fonti di vibrazione.
- Isolata dai forti campi magnetici prodotti da dispositivi elettrici.
- In aree soggette a temporali, è consigliabile collegare il sistema ad un limitatore di corrente. In caso di temporali, scollegare le linee di comunicazione dal modem.
- Dotata di una presa a muro correttamente installata.
- Fornito di uno spazio sufficiente ad accedere al cavo di alimentazione del server, poiché si tratta del modo principale per scollegare l'alimentazione del sistema.

ADVERTENCIAS: Español

	El usuario debe abstenerse de manipular los componentes de la fuente de alimentación de este producto, cuya reparación debe dejarse exclusivamente en manos de personal técnico especializado. Puede que este producto disponga de más de una fuente de alimentación.
	No intente modificar ni utilizar el cable de alimentación de CA si no corresponde al tipo de cable exacto requerido.
	El conmutador del botón de comando de corriente continua del sistema no desactiva la alimentación de CA del sistema. Para interrumpir la alimentación de CA del sistema, debe desenchufar el cable de alimentación de CA de la toma de alimentación.
	INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones: 1. Apague todos los dispositivos periféricos conectados al sistema. 2. Apague el sistema presionando el interruptor encendido/apagado. 3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna. 4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema. 5. Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis — o a cualquier tipo de superficie de metal sin pintar. 6. No ponga en marcha el sistema si se han extraído las tapas del chasis.
	Después de completar las seis instrucciones de SEGURIDAD mencionadas, ya puede extraer las tapas del sistema. Para ello: 1. Desbloquee y extraiga el bloqueo de seguridad de la parte posterior del sistema, si se ha instalado uno. 2. Extraiga y guarde todos los tornillos de las tapas. 3. Extraiga las tapas.
	Para obtener un enfriamiento y un flujo de aire adecuados, reinstale siempre las tapas del chasis antes de poner en marcha el sistema. Si pone en funcionamiento el sistema sin las tapas bien colocadas puede dañar los componentes del sistema. Para instalar las tapas: 1. Asegúrese primero de no haber dejado herramientas o componentes sueltos dentro del sistema. 2. Compruebe que los cables, las placas adicionales y otros componentes se hayan instalado correctamente. 3. Incorpore las tapas al chasis mediante los tornillos extraídos anteriormente, tensándolos firmemente. 4. Inserte el bloqueo de seguridad en el sistema y bloquéelo para impedir que pueda accederse al mismo sin autorización. 5. Conecte todos los cables externos y los cables de alimentación CA al sistema.

continúa

	Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.
	Existe peligro de explosión si la pila no se cambia de forma adecuada. Utilice solamente pilas iguales o del mismo tipo que las recomendadas por el fabricante del equipo. Para deshacerse de las pilas usadas, siga igualmente las instrucciones del fabricante.
	El sistema está diseñado para funcionar en un entorno de trabajo normal. Escoja un lugar: • Limpio y libre de partículas en suspensión (salvo el polvo normal). • Bien ventilado y alejado de fuentes de calor, incluida la luz solar directa. • Alejado de fuentes de vibración. • Aislado de campos electromagnéticos fuertes producidos por dispositivos eléctricos. • En regiones con frecuentes tormentas eléctricas, se recomienda conectar su sistema a un eliminador de sobrevoltage y desconectar el módem de las líneas de telecomunicación durante las tormentas. • Provisto de una toma de tierra correctamente instalada. • Tenga espacio suficiente para acceder al cable de alimentación del servidor, ya que sirve para desconectar la alimentación principal del producto.

Index

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